WOOD WORKING digest

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DECEMBER, 1950

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NAIL

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WEATHER STRIP, ETC.

with
SPOTNAILS
Sizes: 3/8" to 7/8"

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with
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FABRICS AND PAPER

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SPOT-TACKS
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The Spotnails Automatic *Magazine Feed* Machines do a better job—faster and cheaper. Call your local Spotnails representative or write for complete information regarding your specific requirements.

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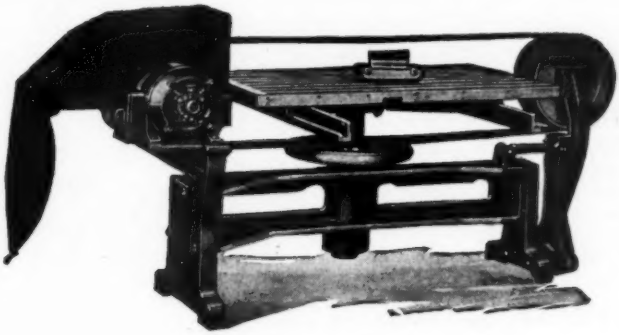
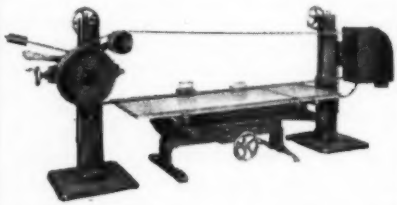
Evanston 1, Illinois

"OLIVER" NO. 298 SELF-CONTAINED BELT SANDER





"Oliver" makes several other Belt Sanders for woodworkers. Above is shown the No. 183 Reversible Belt Sander—an efficient Flat Sander, and also a valuable Moulding Sander. It also finishes built-up pieces of small and medium size. Tell us your sanding problems, and let our engineers recommend a money-saving solution.

for smoothest work . . . a compact Sander with most of the features of our larger Sanders

For many woodworking plants, this "Oliver" Belt Sander will prove a money-maker. Takes small floor space. Sands stock up to 58" long, 26" wide at one setting, and up to 9" high. Table runs on ball bearing rollers with 21" travel. Rubber faced aluminum ball bearing pulleys — driving pulley mounted on motor shaft. Dust hood and bag keep work and floor clean.

Write for Bulletin No. 298

OLIVER MACHINERY COMPANY

Established 1890 **GRAND RAPIDS 2, MICHIGAN**

History Proves

THE GREATEST CHAMPS REPEAT!

★ REMEMBER *Torger Tokle?*

In 1941 Torger Tokle set a new American ski jumping mark of 273 feet at Leavensworth, Washington. Again in 1941 at Hyak, Washington, he bettered his own record with a 288 foot jump. In 1942 he pushed the American record to 289 feet with a jump at Iron Mt., Michigan. In the same year Tokle entered the Army as a leader in the ski patrol. Late in 1944 he was killed in action in the mountains of Italy.

★ REMEMBER *Standard!*

Standard Dry Kilns are helping successful operators in every kind of woodworking plant to set new efficiency and economy records. Because of their championship performance, Standard Kilns have set another record of their own — a record number of repeat orders from these men. They know from experience they can depend on Standard Dry Kilns to *eliminate waste* and *increase their profits.* Yes, in expanding woodworking plants everywhere the demand is for Standard . . . the "CHAMP" in the industry.

Whether you need a new battery of kilns or a single unit, or whether you want to remodel old kilns for greater output and better drying at lower operating cost, look at the record . . . you'll want STANDARD!

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Manufacturers of Internal Fan Kilns

WRITE FOR ILLUSTRATED STANDARD CATALOG

●

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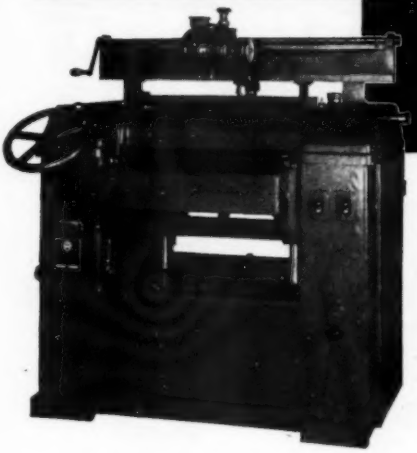
DIVIDEND DESIGN gives the PORTER 405 SURFACER 5 Big Advantages



- HIGHER SPEED OPERATION
- PREMIUM CAPACITY
- FASTER ADJUSTMENT
- EASIER OPERATION
- LONGER LIFE

Because of Dividend Design, a Porter 405 Surfacer will handle more lumber at lower cost than ordinary machines. Its extra margin of speed, capacity and strength produces heavier cuts, smoother work and a more profitable operation.

DIVIDEND DESIGN makes the Porter 405 Surfacer extra fast for surfacing at higher speeds. A matched "V" belt drive rotates the cutterhead at 6,000 RPM to assure clean, smooth, perfect work. This high speed is made practical by the newly designed chipbreaker which keeps the machine running free at all times.

DIVIDEND DESIGN permits heavier cuts on a Porter 405 Surfacer. Free and easy cutting action makes possible the use of an increased blade angle without increasing the size of the motor. This means greater surfacing capacity with no rise in power costs.

DIVIDEND DESIGN simplifies adjustment of a Porter Surfacer. The operator quickly varies the rate of feed even as the lumber moves through the machine.

DIVIDEND DESIGN makes it easier to surface pieces of many different sizes and shapes. Individual magnetic controls prevent operation of the feed unless the cylinder is running. All rolls are power driven.

DIVIDEND DESIGN prolongs the life of a Porter Surfacer. It has the extra strength and extreme rigidity of welded steel, ribbed construction. This provides a durability achieved only with excessive weight with cast iron.

Write today for complete information on the advantages of Porter **DIVIDEND DESIGNED** *machinery*

C. O. PORTER Machinery Co.

668 Front Ave., N. W. Grand Rapids 4, Michigan

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$395. F.O.B. FACTORY

TABLE $195.00 EXTRA

WRITE FOR FREE FOLDER

Beach Swing Cut-Off Saw shown above is popular Model #605 furnished with built-in 5 horsepower electric motor. Also available with 3, 7½ and 10 horsepower motors. All machines are self-contained units of Steel construction. Swinging arm is mounted on ball bearings and has vertical adjustment of 2".

BEACH

MANUFACTURING CO. • MONTROSE, PA.

Wood Working Digest

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The most dependable knife for general purpose high production work.

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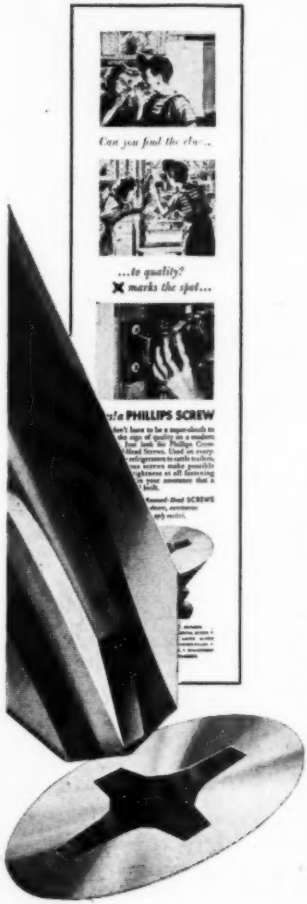
Use of Phillips Screws proves extra care in manufacture

WHEN YOU USE PHILLIPS SCREWS, you prove to the *public* as well as to yourself that you use extra care in manufacture. These screws . . . wood, machine or tapping . . . save time, money, work-hours. They make your product stronger, better looking. They eliminate jagged burrs, split screw heads, make production power driving possible.

What's more, they bring you X-tra benefits in quality. 14 million readers of The Saturday Evening Post are being urged to look for the clue to quality on modern products — *X marks the spot,* the identifying X formed by the cross-recess on the head of every Phillips Screw. Let the public know your product is built with extra care.

◀ Current advertisement on Phillips Screws appearing in The Saturday Evening Post.



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WIDELY USED FOR: White sanding, wash coat sanding, sealer sanding, rubbing lacquer finish, padding in filler . . . and any other special operations needed for a perfect finish. Write for free bulletin W-52.

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SUNDSTRAND MACHINE TOOL CO.

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OK No. 4—special type, high speed steel for wood-working. Easily withstands heat of fast heavy speeds on rough, knotty sandy lumber. Retains keen edge for long runs—gives perfect finishes.

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Gentlemen: Please send me without obligation specific data on knives checked.
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Pre-catalyzed urea formaldehyde adhesive for cold bonding and assembly gluing.

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A stable, powdered phenolic adhesive for hot press plywood and bag molding.

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An unmodified resorcinol-type, room-temperature-setting adhesive for use where extreme durability is essential.

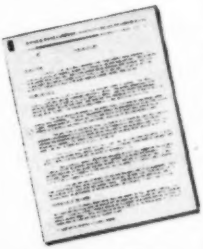
TEGO RESIN FILM

A phenolic, hot press adhesive for boil-proof bonds of proven durability. Especially adapted to thin and fragile veneers.

splice veneers 30% faster with this tapeless, no-mix adhesive!

No mixing. No taping. No soaking or sanding to remove tapes. New UFORMITE JS-508—one-component, *tapeless* splicing glue—gives you tough, invisible bonds in 30% less time! Simply stir into water and apply by your usual process.

You'll get a wider range of assembly times, too, with this pre-catalyzed, pre-lubricated adhesive. Because pot-life is long (8 to 12 hours at 75° F.) the whole day's batch can be prepared at one time. And spread veneers can be spliced at once or as much as three days later—making over-the-weekend shutdowns practical. Storage life under normal conditions is one year.



For faster, easier production on conventional or high frequency splicers—for permanent bonds—manufacturers of plywood and furniture everywhere are adopting dust-free, powdered UFORMITE JS-508. We'll be glad to send you full technical data without obligation. Write Department WDP-3.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

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Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

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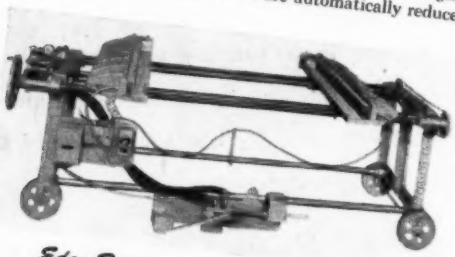
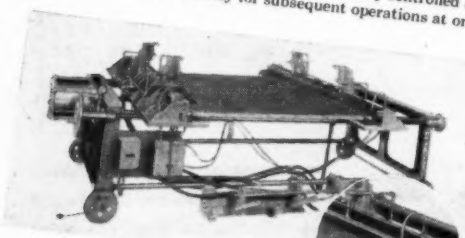
BANDING and Speed BONDING

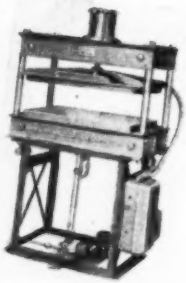
Alert production men are increasingly putting to work specialized Handy equipment for doing tough jobs far better and much faster than out-dated methods. These modern, automatic, low cost machines cash in on the advantages obtainable with resin glues and properly applied heat. Costs are automatically reduced.



Edge Banding is now done almost instantaneously with Handy Series 480 Air-Electric Edge Banders. These units, available in a complete range of sizes, quickly adjust to handle rectangular or square tops of any thickness. The fast cycle and heat are automatically controlled and the veneer is bonded ready for subsequent operations at once.



Rim moulding is put on desk tops in a hurry by the Handy 490 Series Air-Electric Wood Moulding Bonders. Long tedious work and the use of hand clamps are eliminated. Now the binding of tops is accomplished in minutes, and they are ready for further operations promptly, while freeing valuable space formerly required during slow glue curing. This new way is better and faster.



Handy No. 836 Automatic Air-powered Electric Hot Platen Presses are the modern way to quick-bond panels to frames, veneers to table tops, and other work where correctly applied heat and pressure is the answer to today's higher production needs. The cost is low, the results are great. Consult Handy

HANDY
Manufacturing Company
2436 WEST LAWRENCE AVE.
Chicago 25, U. S. A.

METAL MOULDING GOES ON TABLE TOPS
GOOD and FAST

With the Handy No. 604 Air-Electric Moulding Inserter, all the operator does is put in any top, operate the controls and remove the perfect, finished job. Handles all shapes, all widths of moulding and often eliminates notching. Features cushioned double-roller power; it's better and faster.

Production Costs Getting You Down?

...time to get a WHITNEY 97 DOUBLE SURFACER

Feeds: 30 to 90 feet per minute. Planes stock 1/16" to 7" thick. Widths: 30", 36", 40" and 44" widths.

THE efficiency of your planing department can mean the difference between operating at a profit or a loss. So why not replace slow, inefficient, wasteful planing equipment with Whitney Production Planers that are designed for today's production jobs and quality built for long-lasting, low-cost service.

The Whitney 97 Double Surfacer is a ruggedly built, precision tool that will assure smoother, more accurate surfaces at faster feeds. Will reduce sanding costs and eliminate wasteful handling operations. Install one of these highly efficient, production tools and watch your production costs come down. Write for 97 Planer Bulletin and complete information.

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- Whitney Automatic, Self-reversing Knife Grinder
- Finger-tip Controls
- Safe, Convenient Operation

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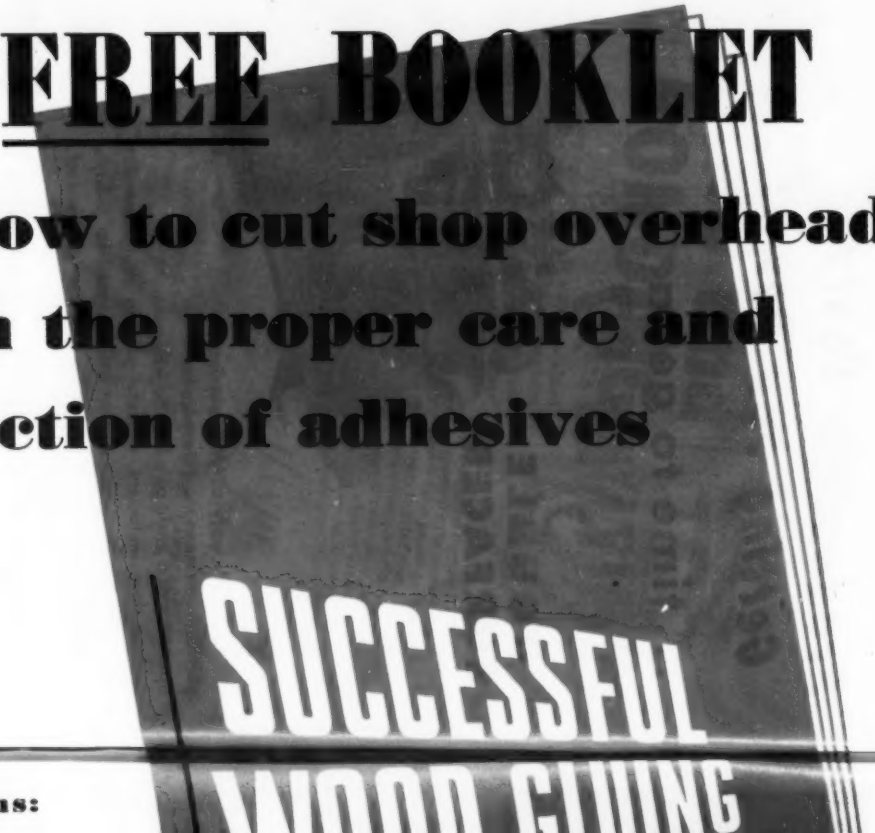
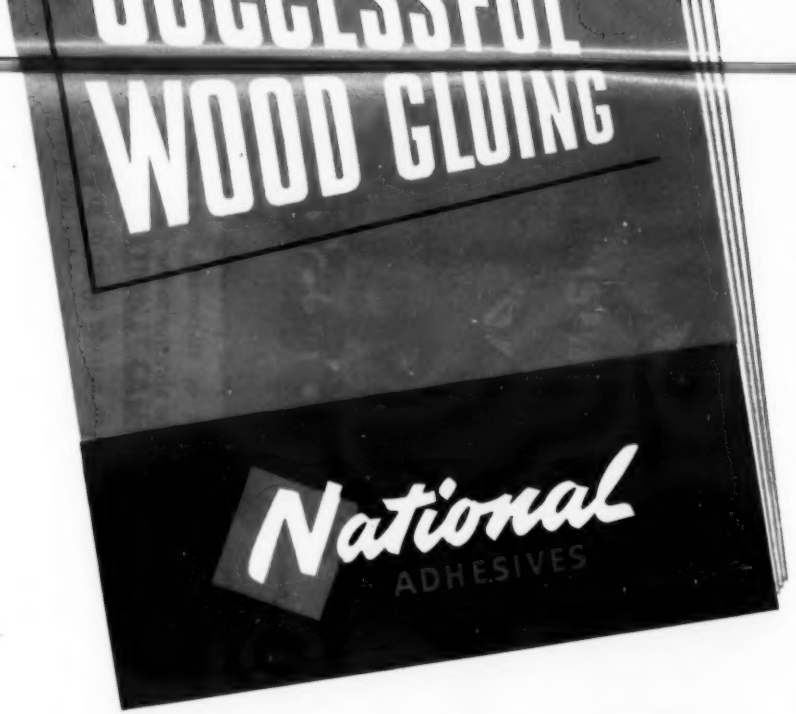
tells you how to cut shop overhead through the proper care and selection of adhesives



Answers these Questions:



Answers these Questions:

How can I increase production without adding to present equipment? . . . How can I cut tool re-sharpening costs? . . . What are the requirements of a good assembly joint? . . . Why do joints fail? . . . How do natural glues differ from synthetics? . . . Where should each be used? . . . How should glue be stored? . . . What are the best handling procedures for natural and synthetic glues? . . . What equipment is necessary? . . . How can I avoid dilution troubles?

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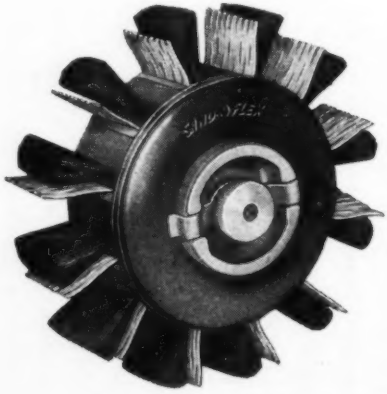
Simply hold your irregular work pieces in hand and let the Sand-O-Flex wheel do the twisting instead of your flabby bodice. These amazing brush-backed sanders produce miracle finishes on a moment's notice. No skill required. Fasten them to your present power tools, portable or stationary. Brushes mold the abrasive to the work shape. Four different sizes. Abrasive cartridges in a wide range of grits. See your dealer. Write today for catalog and prices. Merit Products, Inc., 4023 Irving Place, Culver City, California.



DOES YOUR GLUE CONSUMPTION WARRANT BULK STORAGE?

TANK CAR

TANK TRUCK

DRUMS

NATIONAL CASEIN HAS A GLUE PLAN TO FIT YOUR NEEDS

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Big Table— Small Cost!

Another ROCKWELL product

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plus zone delivery charge

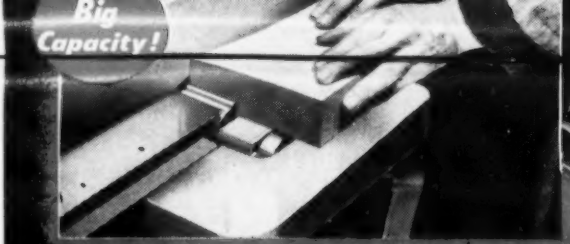
Motor and switch extra

(Price subject to change without notice)

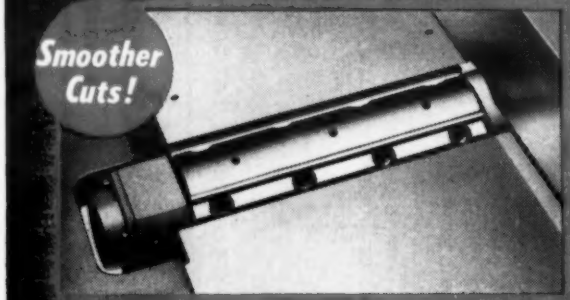
DELTA MILWAUKEE

Big Capacity!

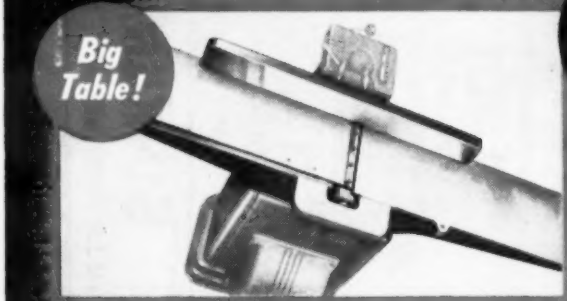
Gives you the most



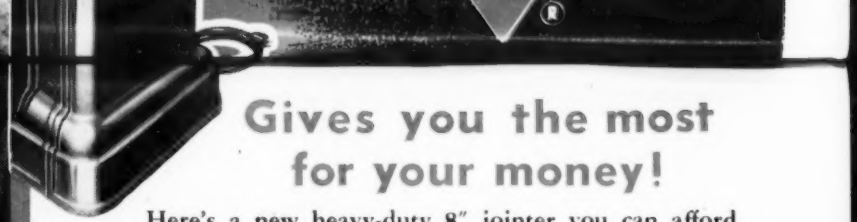
Cuts 8" wide, rabbets ½" deep.



Cutterhead has 4 knives, gives you 16,400 c.p.m.



60"-long working surface.



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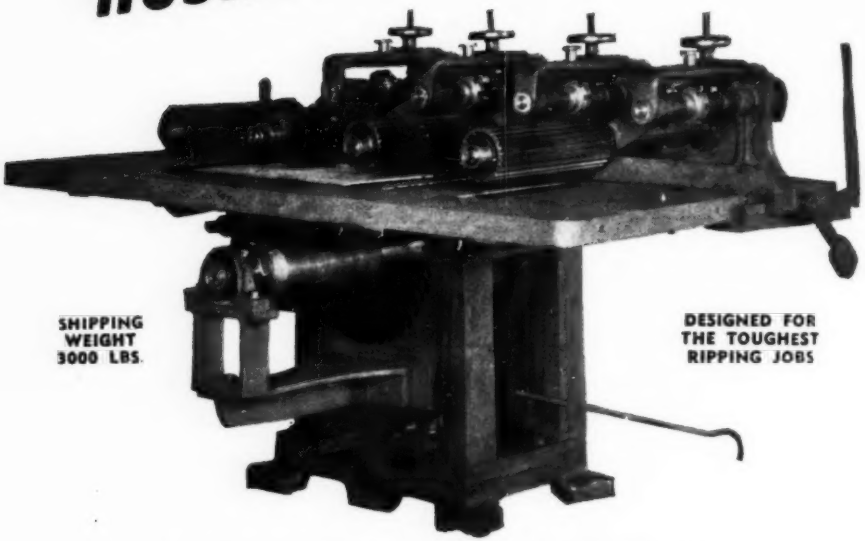
A REAL HUSKY...

NO. 213 HOOSIER SELF FEED RIP SAW



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DESIGNED FOR THE TOUGHEST RIPPING JOBS

FOR QUICK OPERATION - DEPENDABLE PERFORMANCE

This sturdy unit is designed specifically for high speed ripping of stock longer than 24" and as a gang ripper for stock as short as 12". The No. 213 is equipped with a stationary table top having all feed works brackets bolted to the top—as is the gear reduction drive. The mandrel rides on ball bearings and is raised and lowered quickly by a hydraulic cylinder. Eight driven rolls feed the stock through the saw at high speed. A 50 H. P. motor drives this unit at full capacity. The No. 213 is a real workhorse, built to handle your toughest jobs.

Available for direct motor, V belt or flat belt drive.

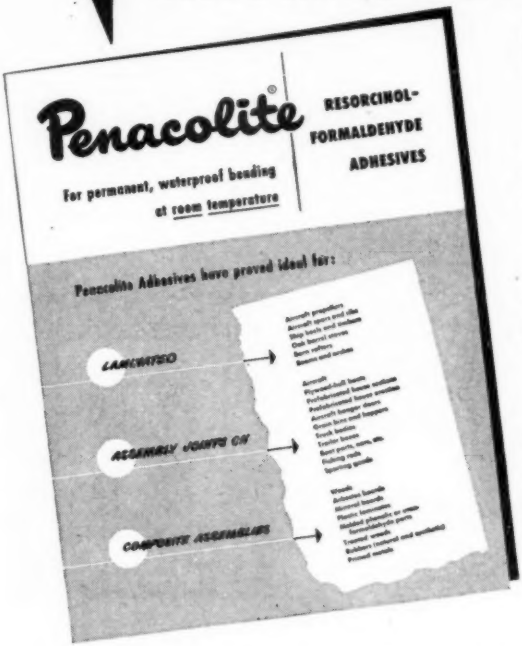
SINKER-DAVIS *Company*

230-250 SOUTH MISSOURI ST. DEPT. 0 INDIANAPOLIS, INDIANA

LATEST INFORMATION ON

Room-Temperature Bonding

NEW BOOKLET ON PENACOLITE® RESORCINOL ADHESIVES



tells...

HOW Penacolite Adhesives form waterproof, *permanent* bonds at room temperature, with normal glue-room equipment . . .

WHY Penacolite Resorcinol Adhesives are best for assembly gluing for most severe service requirements . . .

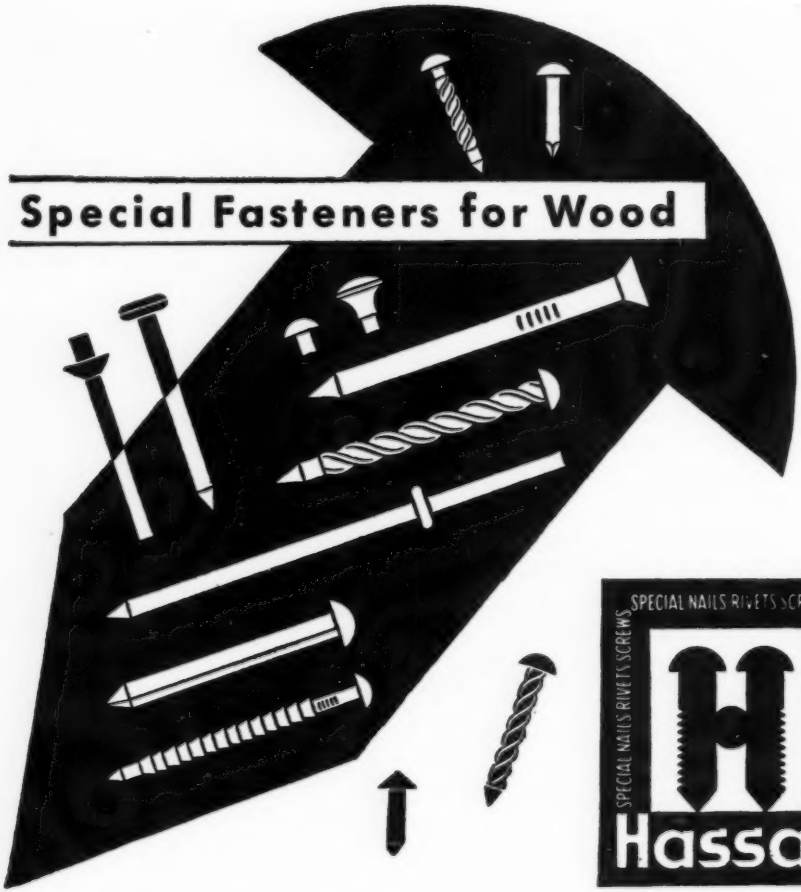
WHERE Penacolite Adhesives can be used. (This impressive list of job uses includes laminations, assembly joints, and composite assemblies . . . of various woods, plastics and rubbers.)

● We would welcome the chance to study your particular bonding problem . . . to suggest the right Penacolite Adhesive for your particular job . . . to have Penacolite Resorcinol Adhesives prove their effectiveness in your shop. In the meantime, why not send for this booklet and further details about quick-setting, easy-to-apply, *permanent* Penacolite Adhesives? No obligation, of course.

KOPPERS

KOPPERS COMPANY, INC.
Chemical Division, Dept. WWD-120, Koppers Building, Pittsburgh 19, Pa.

PENACOLITE RESORCINOL ADHESIVES



HASSALL special nails, drive screws, annular threaded screws to order for your specific use . . . Made in diameters starting at .024 —lengths up to 7" . . . Variety of metals, finishes and secondary operations . . . Nails of uniform length, gauge and heads for machine driving . . . Also rivets and other cold-headed specialties to order . . . Economy, quality and quick delivery in large or small quantities . . . Tell us what you need . . . We will answer promptly . . **ASK FOR FREE CATALOG** . . . 3-color Decimal Equivalents Wall Chart free on request.

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SPEED

Your Production! Raise the quality of Your Planing!

No. 380-A
PLANER

THE PRECISION PLANER

There is NO SUBSTITUTE for Quality! Price alone is never a true gauge of value. Power Planers offer PREMIUM VALUES at standard prices. Eighty-three years of quality manufacturing back our claim to PRECISION WORKMANSHIP. Thousands of satisfied users are our best advertising. The Model 380 Planer is modern—rugged—compact—safe—but, most of all, it's TOPS IN PLANING.

HIGHEST QUALITY SINCE 1867

Planers - Tenoners - Planers & Matchers
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L. POWER & CO.
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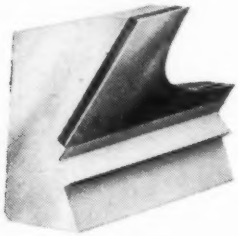
Manufacturers of POWER Machinery Since 1867

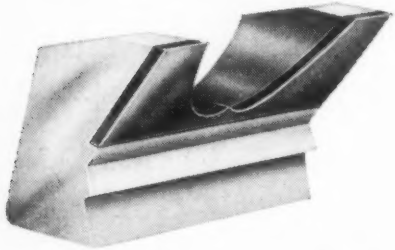
NOW – Marcoloy Carbide
Form Knives engineered for you!

The most intricate forms can now be cut with long-lasting Marcoloy Carbide Knives.

These new and unique Carbide Form Knives have many exclusive features —

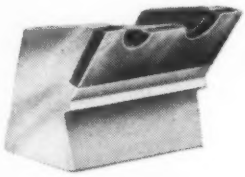


- **They're as easy to sharpen as straight knives. (They're sharpened on the face only, never on the clearance side.)**
- **Your forms stay true and uniform for the life of the knives.**
- **These knives are safe! They can't be thrown from head because of dovetail construction.**



- **The carbides are securely bonded to the shank by a new process.**
- **Marcoloy Carbide Knives are *engineered* for your form and your job.**
- **Marcoloy Carbide Knives now cost very little more than ground-to-pattern *HSS knives*.**

They will have the correct design for the application. The cutting angles and clearances will be designed for your particular machine and job.



Every order will be studied in our engineering department, and the design will be especially for your job.

You may have the recommendations of Marcoloy engineers for the asking. Just send us a sample of the form you are considering, along with necessary machine information.

Marcoloy, Inc., Springdale, Conn.

MARCOLOY CARBIDES

Marcoloy
Springdale, Conn.

Please send me complete information on Marcoloy Carbide Knives and Carbide Saws

Name_____

Company_____

Address_____

"Discover how wonderfully small trifling expenses mount up to large sums."

—Ben Franklin's Almanac, 1757

A single per cent saved here and another per cent saved there strengthens thy working capital for the coming year.

—Acme Steel Notebook, 1950*

Improved efficiency . . . greater thrift! For better than 70 years, Acme Steel methods and Acme Steel products have been helping American business obtain the benefits of these tried-and-true business virtues.

Almost every American industry is represented among Acme Steel's more than 50,000 customers, particularly in departments and operations concerned with packaging, shipping and materials handling.

For information on Acme Steel products, write on your business letterhead for free booklets on the specific products in which you are interested.

ACME STEEL COMPANY

Dept. WD-120, 2838 Archer Ave., Chicago 8

There are 46 Acme Steel service offices in the principal cities of the U.S. and Canada.

Cut your handling costs—Bundle with Acme Steelstrap

Acme Methods give you faster, safer handling. Two men with a fork truck unload 1000 board feet of crating lumber in 4 minutes, cut handling costs 65%!

*The sagest maxims of Ben Franklin, together with modern parallels, appear in Acme Steel Notebook, 1950. We have a free copy for you. Just ask for it.

ACME STEEL CO. CHICAGO

ACME STEEL

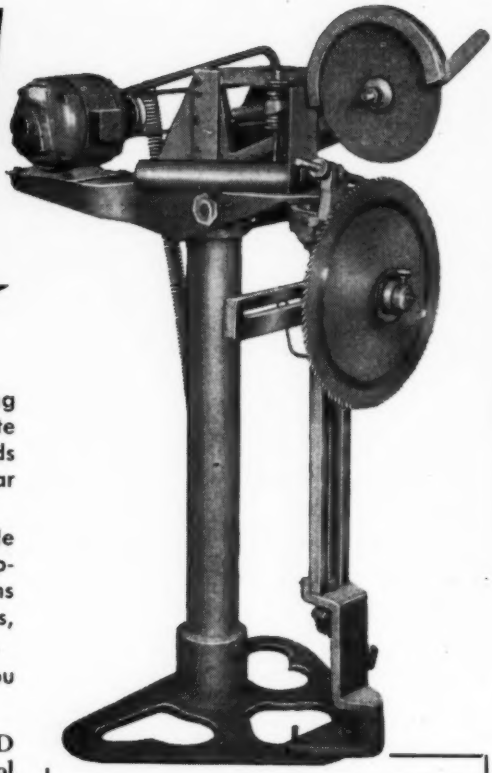
Of the 3808 Acme Steel employees 337 or 8.8% have worked with Acme for more than 25 years each and are members of our Quarter Century Club. Their total service represents 9305 years—tribute to "A Good Place to Work."

ACME STEELSTRAP flat steel strapping and ACME UNIT-LOAD carload bracing BAND, SEALS and TOOLS • ACME SILVERSTITCHER machines • ACME SILVERSTITCH stitching wire • ACME-MORRISON METAL STITCHERS and BOOK STITCHERS • ACME-CHAMPION BAG STITCHERS • ACME HOT AND COLD ROLLED STRIP STEEL • ACME GALVA-BOND steel slat stock for Venetian blinds • ACME STEEL SPECIALTIES, including hoops, corrugated fasteners, nail-on strapping and other container reinforcements • ACME STEEL ACCESSORIES—snips, cutters, punches, tool mounts, reel stands, coil holders, coil trays.

HANCHETT

NO. 136

Hand Gummer and Sharpener for Rip and Cross-Cut Circular Saws



Keep your saws in keen cutting condition for faster, more accurate work! The Hanchett No. 136 grinds all types of rip and crosscut circular saws from 6" to 36" diameters.

It pays off in action on a wide variety of jobs — gumming, sharpening, jointing. That's why it earns its way in small mills, pattern shops, woodworking plants everywhere.

These Hanchett features give you operating speed and accuracy:

1. STRAIGHT LINE HEAD ACTION—For accurate control of grinding head movement.
2. ADJUSTABLE HEAD AND TOOTH STOPS—Insure proper tooth spacing for precision sharpening.
3. SELF CENTERING SAW HOLDER—Saw swivels easily even under dirty, gummy conditions.

Write Dept. WWD-120 for details

$290.00 Belt or Motor Drive

Optional, either large or small saw attachment — $35.00 extra.

COVEL SAW SHARPENERS • HANCHETT KNIFE GRINDERS

HANCHETT MANUFACTURING COMPANY

WORLD'S LARGEST MANUFACTURERS OF SAW AND KNIFE GRINDING MACHINERY

Main Office BIG RAPIDS, MICH., West Coast Office PORTLAND, ORE.

SKIL Oscillating Sander is the finest finisher you can buy . . . and STILL ONLY $87.50

TWO-WAY ACTION for fast cutting, smooth finishing! With famous SKIL Sander compound motion, front edge cuts *fast* with circular motion; trailing edge sands *satin-smooth*, working back-and-forth *with* the grain.

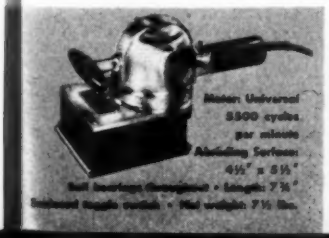
NEW QUICK-CLIP PAPER CLAMP for speedy paper changes! Simplest, surest paper-holding device ever made. Nothing to adjust! Nothing to get out-of-order! You change paper *in seconds* . . . waste no sanding time.

NO TIRING VIBRATION . . . easiest to use! New design cuts vibration to the absolute minimum. See for yourself how quietly it runs Smooth operation cuts operator fatigue . . . increases production.

SANDS RIGHT INTO CORNERS without danger of marring! Optional method of paper attachment permits sanding into recesses of door panels, tables, etc No metal to scratch or mar finest surfaces. You get perfect sanding in every spot.

Compare *improved* Model 438 SKIL Oscillating Sander with *any* make at *any* price! Test it on your own jobs . . . for performance, production and ease of operation. SKIL Sander wins on every count . . . and a look at these features tells you why!

Ask your SKIL Tools Distributor for an on-the-job demonstration of *improved* SKIL Oscillating Sander. It's sure to bring new standards of performance and production to your finishing operations.



SKIL PORTABLE TOOLS

SKIL Products are made only by
SKILSAW, INC.
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD.
66 Portland St., Toronto, Ont.

SKILSAW, INC.
5033 Elston Ave., Chicago 30, Ill.

Gentlemen:

☐ Please send me full information about *Improved* SKIL Oscillating Sander.

☐ I'd like an on-the-job demonstration of *Improved* SKIL Oscillating Sander.

Name.....

Address.....

City.....*Zone*.....*State*.....

Military Specifications for glues and plywood

☆☆☆☆ recommended materials to comply

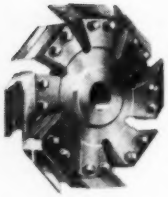
No. of Specification Date of Latest Issue	TITLE	MATERIALS TO COMPLY		
AN-G-8 **25 April 1942**	Glues, cold-setting resin	Type I	CASCAMITE 66M with M-42 (3.5 parts)	No extension
			CASCAMITE 151 with FM-50 (20 parts)	No extension
			CASCAMITE RF-88 with FM-120 (15 parts)	No extension
		Type II	CASCAMITE 12	No extension
			CASCAMITE 14	No extension
		Type III	CASCO-RESIN 5 with FM-62 (15 parts)	No extension
			CASCO-RESIN 150 with FM-142F (12-15 parts)	No extension
			CASCO-RESIN 150 with FM-108 (25 parts)	No extension
AN-P-43 **31 March 1943**	Plywood, aircraft, molded (fluid pressure)	Glues to meet JAN-A-397 or MIL-A-5534		
CG-456 **8 July 1941**	Glue, casein type, water resistant	CASCO Grade A, Aircraft Joint P, 350, 231-P		
CG-496 **17 June 1946**	Glue, resin type (liquid and powder)	Same as AN-G-8		
JAN-A-397 **28 October 1948**	Adhesive, room-temp. and intermediate-temp.-setting resin (phenol, resorcinol and melamine base)	Type I	Class I — CASCOPHEN RS-240M	
			Class I or II—CASCOPHEN RS-216, RS-224	
		Type II	Class I or II—same as Type I, also CASCOPHEN LT-67	
JAN-P-139 **22 August 1946**	Packaging and packing for overseas shipment. Plywood, [illegible]	Type A	CASCOPHEN HP-402	No extension
			CASCOPHEN HP-403	No extension
		Type B	CASCAMITE 66M (cold)	60 parts flour
			CASCAMITE 66M (hot)	115 parts flour, 5.8 penta.*
			CASCAMITE 151 (cold)	60 parts flour
			CASCAMITE 151 (hot)	135 parts flour, 6.75 penta.*
			CASCO-RESIN 5 (cold)	50 parts flour, [illegible]
			CASCO-RESIN 30 (cold)	30 parts flour
			CASCO-RESIN 30 (hot)	68 parts flour, 5 penta.*
			CASCOPHEN HP-402, 403	100 parts flour, 5 penta.*

JAN-P-139 **22 August 1944**	Packaging and packing for overseas shipment. Plywood.		Cascamite 151 (hot)	135 parts flour, 6.75 penta.*
			Casco-Resin 5 (cold)	50 parts flour, 2.5 penta.*
			Casco-Resin 30 (cold)	30 parts flour
			Casco-Resin 30 (hot)	68 parts flour, 5 penta.*
			Cascophen HP-402, 403	100 parts flour, 5 penta.*
			For veneers over ¼" thick, reduce extender 33%	*pentachlorophenol
MIL-A-5534 **9 January 1950** ***Supersedes:*** **AN-A-45** **USAF-14139**	Adhesive, high temperature-setting resin (phenol, resorcinol and melamine base)	Cond. A.	Cascophen RS-216 with FM-60M (20 parts)	11.5 pts. Glufil
			Cascophen RS-240M with FM-124(20 parts)	15 pts. Glufil
			Cascophen RS-224 with FM-128 (25 parts)	15 pts. Glufil
			Cascophen LT-67 with H-23 (6 parts)	20 pts. Glufil
		Cond. B.	Cascophen HP-403 hot press	30 pts. Glufil
			Cascophen HP-402 with H-21 (4 parts)	No extension
MIL-P-6070 **29 March 1950** ***Supersedes:*** **AN-P-69a**	Plywood and veneer Aircraft flat panel		Glues to meet AN-A-45 (MIL-A-5534)	
CS35-49 **1 December 1949** ***Supersedes:*** **CS35-47**	Hardwood plywood	Tech. or Type I	Any Cascophen	No extension
		Type II	Casco-Resin 5 cold press	100 parts flour
			Casco-Resin 5 hot press	125 parts flour
			Cascamite 66M cold press	115 parts flour
			Cascamite 66M hot press	150 parts flour
			Cascamite 151 cold press	150 parts flour
			Cascamite 151 hot press	185 parts flour
			Casco-Resin 30 cold press	83 parts flour
			Casco-Resin 30 hot press	105 parts flour
			Casco Grade A, 350, 231-P, Air Joint P, 375, S-2195	
MIL-P-66A **27 December 1949** ***Supersedes:*** **JAN-P-66**	Plywood, flat-panel		Hardwood plywood to meet CS35-49	

● Send for your free copy of Casco Service Bulletin 82, "Government Procurement of Wood, Plastics and Paper Products." Lists Purchasing Offices, includes complete Specification Chart, tells how to estimate glue costs. It's part of Borden's Glue Service. Address: Dept. WD-120 The Borden Company, Chemical Division, 350 Madison Avenue, New York 17, N. Y.

Borden's

CHEMICAL DIVISION



When you have a cut that looks impossible, why not put Diehl's 40 years of experience to work for you? Diehl may help you find a way to eliminate several operations.

For the special dovetail method of fastening the blades, and the design of throat and individual bevel, often do permit cuts never before accomplished.

And Diehl cutterheads are designed to save you money other ways, too. Burning and tearing are unknown. Blades are interchangeable, easy to grind, easy to set-up, and heads can be made to fit any size or style of spindle.

Diehl design, plus long experience in serving the industry, gives you mechanized woodworking at its best—helps you turn out quality work faster and at a saving to you.

Write today for complete information about Diehl cutters and cutterheads— and about the design service that is available to you on any of your problems.

*It Can't be Done** but DIEHL does it!

*Milled to pattern knives for making lock corner joints, for example, "couldn't be made" — but Diehl did it.

OTHER DIEHL PRODUCTS: Rip Saws & Cut-off Saws — Diehl-Vonnegut Moulders — Veneer Splicers and Jointers — Tapeless Splicers — Glue Jointers & Edge Moulders — Edge Gluing Machines — Cutter Grinders.

CUTTER DIVISION

On the Banks of the Wabash

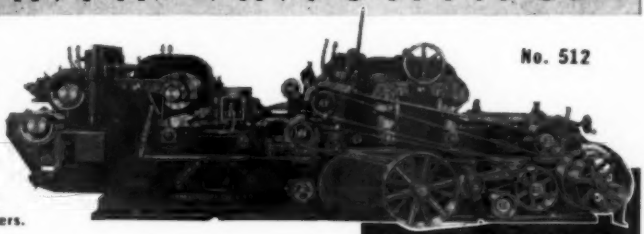
THE G. M. Diehl MACHINE WORKS, INC.

WABASH, INDIANA • U. S. A.

NEWMAN MACHINES

Newman

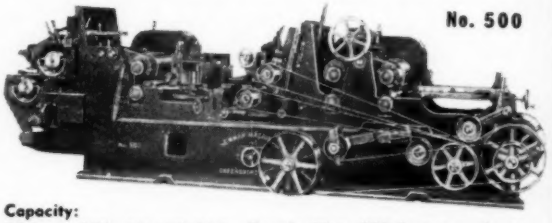
No. 512



Capacity: 16" and 24" wide, 8" thick.
Speeds up to 325 feet per minute.
8" dia. cutting circle.
Six 12" dia. feed rolls.
Single and double profilers.

BALL and ROLLER BEARING PLANERS AND MATCHERS

No. 500



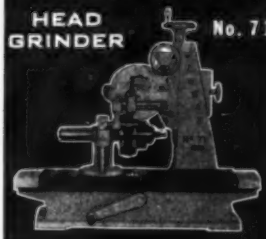
Capacity:
14" and 24" wide, 6" thick. Speeds 40 to 200 feet per minute. 7" cutting circle. Six alloy steel feed rolls. High carbon special alloy steel cylinders. Single or double profilers.

ORDER NOW FOR EARLY DELIVERY

ALL NEWMAN cylinders or heads are DYNETRICALLY BALANCED insuring an accurate and superbly finished product.

The ball bearing NEWMAN 71 (shown below) will grind all sizes of cutter heads. Table is 33" long by 9" wide with horizontal travel of 25" and is heavily ribbed to maintain accuracy over entire travel. Maximum cutter head swing is 11".

HEAD GRINDER **No. 71**

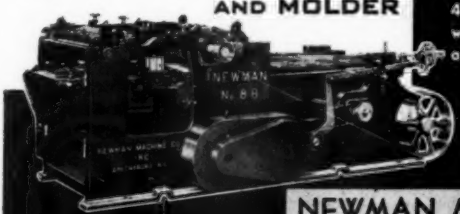


Ball and Roller Bearings

No. 55 AUTOMATIC PINEAPPLE FEED TABLE

The NEWMAN 55 feeds stock automatically to high speed planers and matchers up to 450 lineal feet per minute. Capacity: 30" wide, 8" thick. All adjustments and controls are centrally and conveniently located.

No. 8-B PLANER, MATCHER AND MOLDER



The NEWMAN 8-B planes 22" wide and 8" thick, joints 4" thick and will match 14" wide. 6" diameter feed rolls. Speeds of 30, 50 and 75 feet per minute.

Unsurpassed for work in small and medium mills

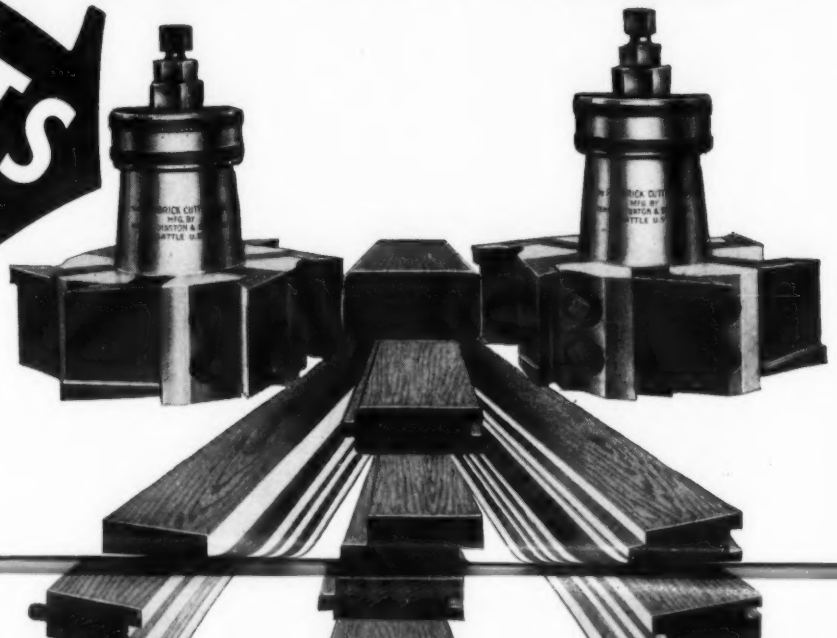
MAY WE SEND YOU FULL DETAILS?

NEWMAN MACHINE COMPANY, INC.
GREENSBORO, NORTH CAROLINA, U.S.A.

DISSTON PHILBRICK®

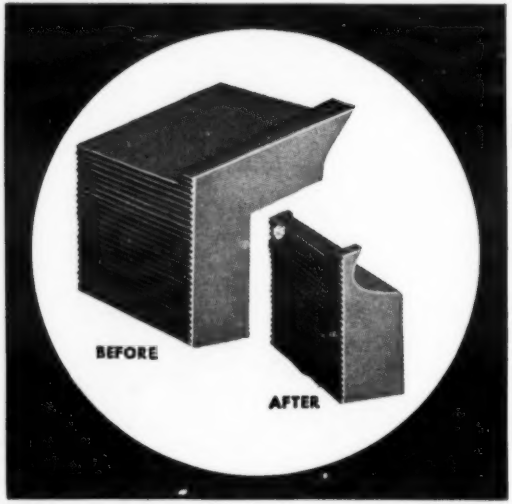
GENERATED TYPE (Milled to Pattern)

CUT COSTS CUTTER HEADS



ONE GOOD REASON

You can work a wide variety of patterns with each pair of Disston Philbrick head bodies. Knife changes are quick, simple. No holders, clamps, gibs—no trouble. Work safeguarded. Manpower, downtime and material saved.



ANOTHER GOOD REASON

36,000,000 lineal feet cut by one set of generated knives like the above. Pattern retained for full 1 1/16" of wear with standard heads on flooring, eased edge and similar patterns. That's typical Disston Philbrick knife life *and economy*. Compare these figures with your present knife costs.

STILL MORE GOOD REASONS

Longer life—with Disston Philbrick heat treated alloy heads.
Smoother operation—with precision-made heads, dynamically balanced.
Added rigidity—with thrust direct to strong head body (makes a smoother finish).
Faster feeds, heavier cuts—with thicker knives, greater throat room, free discharge of shavings.
Smoother finish, more footage produced, lower investment and operating cost—with Disston Philbrick Cutter Heads.

ESTABLISHED 1840
REG. U.S. PAT. OFF.

HENRY DISSTON & SONS, INC.
1295 Tacony, Philadelphia 35, Pa., U.S.A.
Canadian Factory: 2-20 Fraser Ave., Toronto 3, Ont.

YOU MUST PAY THE FIDDLER

BUT PAY ONLY ONE!

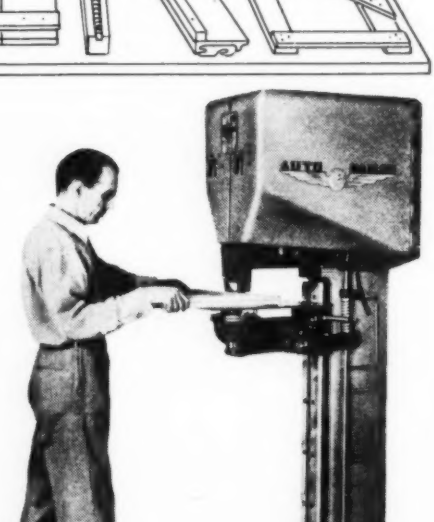
IF one Fiddler can play as well as five—Why hire the extra four?

AND—why have five men doing hand nailing when the Auto-Nailer can put out more work . . . faster . . . better?

Auto-Nailer not only does the nailing of from 3 to 5 men, it practically ELIMINATES WASTE. It makes, drives and sets 3 nails per second—in all materials.

Has quick, accurate settings for nail length and countersink.

TWO MODELS:
SPARTAN, for heavier work;
CRUSADER, for lighter work.



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THE AUTO-NAILER CO.

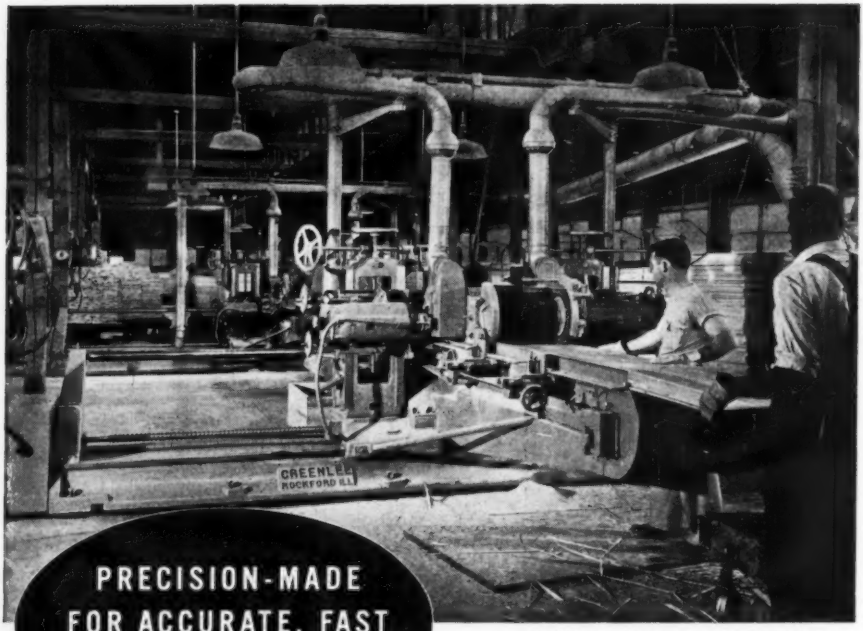
267 MARIETTA ST., N. W. • ATLANTA, GEORGIA

PEACE ★ *on* *Earth*

How much it will mean to us all when once again the Christmas sentiment expressed in the words "Peace on earth, Good Will toward men," will become a reality. Our efforts to bring about that peace have not been too successful. In fact we are fighting for that peace right now and may be for some time to come.

It is interesting to note that the business men of 32 nations, including our own, are now studying plans for the future course of ECA and OEEA in a re-arming world. These men are anxious to perpetuate the fine work they claim these two organizations have done. They are surveying the situation in the hope that they will be able to formulate positive suggestions for combining the requirements of reconstruction with those of defense. They feel the need to safeguard the economic gains already achieved. In fact, they say that if we are bold and intelligent in safeguarding the economic gains ECA has achieved, we may be able to avoid the further use of arms. God grant them the ability to accomplish their desires and bring the peace for which we hope so sincerely.

Ned Bailey
Editor-in-Chief



GREENLEE DOUBLE CUT-OFF SAW IN OPERATION AT STATESVILLE PLYWOOD AND VENEER COMPANY

PRECISION-MADE FOR ACCURATE, FAST PRODUCTION

...Greenlee No. 542 Electric Double Cut-Off Saw

"We wish to congratulate you on the fine double-end trim saws recently placed in operation here. They show beautiful workmanship and they really do a fine job."

That's what Mr. Elbert M. Shelton, president of Statesville Plywood and Veneer Company, Statesville, N. C., has to say about their new GREENLEE No. 542 Cut-Off Saws.

Reasons are many why the GREENLEE No. 542 does such smooth, accurate work . . . and at high speed! First is because each one is made so sturdily . . . built to handle the work with ease and stand up under production requirements at high speeds for a long, long time.

Next is its "watchwork like" construction and the precise setting arrangement which permits making adjustments to a fraction of 1/64". Accurately graduated dials show the exact setting of the movable housing, and the machine cuts exactly to the size indicated by the dials.

And remember, too, the GREENLEE No. 542 is extremely versatile. In addition to its double cut-off operations, with attachments it will handle your shaping, relishing, tenoning, dadoing or scoring.

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GREENLEE WOODWORKING MACHINERY: MORTISERS • BORERS • SAWS • TENONERS • PLANERS • SHAPERS • MORTISING and BORING TOOLS

Pointed Paragraphs

It is evident that our government is trying to keep enough materials available, other than war products, to supply a restricted demand. The next few months will find us making war materials on a large scale whether the war in Korea is ended or not. We are going to have the fighting equipment available even though we may not need it at the moment.

This month's editorial touches briefly on the efforts of the International Chamber of Commerce to develop a plan or plans that will make it possible to carry on our work of reconstruction while handling the rearmament job. They are sending out questionnaires to get information on manufacturing facilities as well as suggestions. Don't fail to fill yours out and send it in. Such a plan, if worked out, paralleling the two efforts might mean the difference between peace and war. The peoples of Europe and elsewhere brought to utmost poverty during World War II still need to be helped. If they are not, they will become easy prey to the deceiving communist propaganda.

Little girl: Daddy, why do editors call themselves "we"?

Daddy: To fool the readers into thinking there are too many of them to beat up.

Up to and including September, the demand for and supply of veneer were both holding up to the high records set during the summer with shipments still behind orders.

Oak and American walnut veneer production is now sufficient to take care of all present demand, we are told.

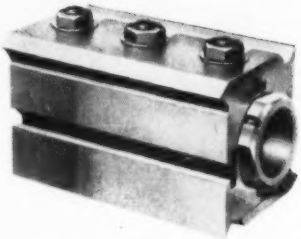
(Continued on page 40.)

Check Your Needs!

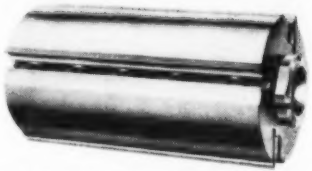
CUTTERHEADS

MILLED-TO-PATTERN BITS AND KNIVES

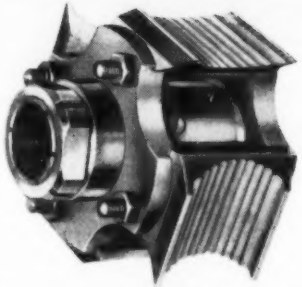
FOR THE MANUFACTURE OF FLOORING, SASH AND DOOR, FURNITURE, NOVELTIES, WOODEN TOYS . . .



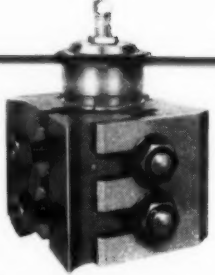
Square Top or Bottom Head. Made of selected steel and equipped with heat-treated bolts and nuts.



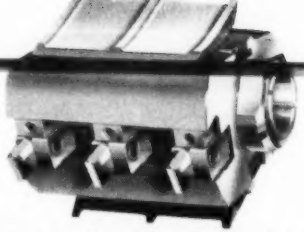
Self-Centering or Straight Bore Round Head. Furnished with high-speed steel thin knives.



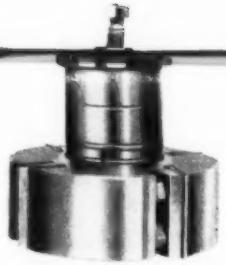
Series No. 430 Vise-Grip Cutterhead. An economical and practical head for side or top and bottom spindles.



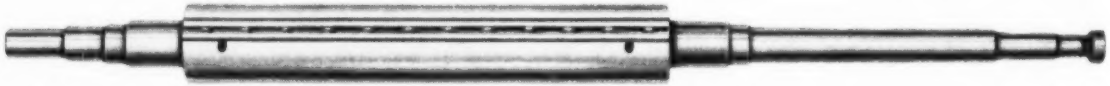
Square Side Head. With open or closed end, self-centering sleeves. Furnished with bolts.



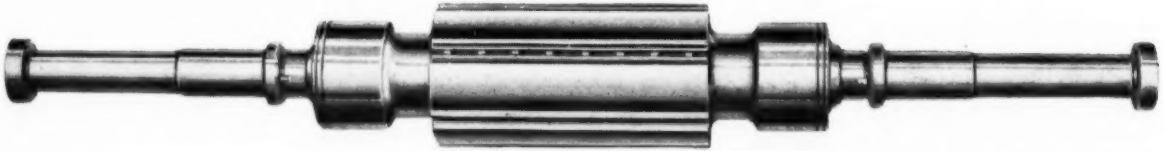
"600 Series" Combination Head. Ideal for moulding and splitting narrow stock.



Round Side Head. Furnished with open or closed end sleeves. Plain or corrugated back knives.



Planer Cylinder for ball bearing or babbit bearing machines. Available with as many as six knives.



Matcher Cylinder. Made of special steel forging. Furnished with high-speed steel thin knives.

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(Continued from page 37.)

For obvious reasons new home building has finally started to get down to a lower volume. September was 26,000 below August and what with credit and other controls being clamped on, plus the seasonal slump, we can look for a continued slowing down for the balance of the year.

Manufacturers of furniture find business dropping slowly to last year's levels which still represents good volume. The January Market at Chicago may go back to the "buyers."

Slowing up of furniture sales may be a good thing as it will permit manufacturers to get stocked up for later on when materials may not be as available as they are now.

We mention again that reprints of the article "Cutting Technique for Wood," will be available. Let us know how many you would like to have.

Molding and general use of wood waste in various types of salable items is on the increase. There are still aspects of this type of manufacture as yet unexplored.

Military plywood needs will take about 15% of the year's last quarter outturn. However, we are told that there will still be more fir plywood for civilian uses than ever before.

If you are interested, the National Security Resources Board will give you all necessary information about the rules that will apply in issuing "certificates of necessity" in connection with five-year depreciation of emergency defense facilities for tax purposes. You can also procure from the board the forms to be used in seeking approval of this speed up of amortization of the cost of plant expansion.

Someone once said that friendship is the only cement that will hold the world together.

easy to fabricate

Masonite Hardboards can be punched, drilled, routed, sawed, beveled, sanded, shaped and die-cut. Save time, reduce costs!

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They're dimensionally stable! Masonite Hardboards won't pull or twist out of shape. No cracks appear to let dust seep through. And, since they are equally strong in two directions, they make a perfect core or cross-banding material for door panels, tops and drawer bottoms.

take and hold any finish or lamination Paints, enamels, lacquers, stains or wax can be applied by brushing or spraying. You can silk-screen or lithograph designs on them. You can laminate wood, veneer, fabric, metal or plastic to them.

resist surface injuries

With their high density and hardness, smooth-surfaced Masonite Hardboards resist dents, scratches, scuffs and other abrasions.

won't split, splinter, crack or dent The same consistency through and through. No splinters to snag fingers or dainty clothing. No grain to rise and mar handsome applied finishes.

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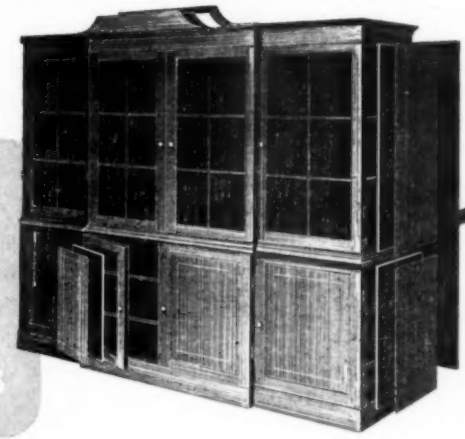
MASONITE HARDBOARDS



With its quiet grace and clean-flowing lines, this handsome breakfront whispers, "Here is Quality." And here, as in so many case goods, you will find Masonite Hardboards.

These hard-working panels of "wood made better" are adding to the original quality, the life expectancy and the usefulness of all types of furniture . . . and in all price lines. Further, they permit faster production and lower costs.

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Manufacturing

FROM WOOD RESIDUES

A REPORT FROM THE OREGON FOREST PRODUCTS LABORATORY

IT IS COMMONPLACE to read articles that deplore the so-called "waste" that accompanies the conversion of standing trees into lumber and allied products. A great deal of this "waste," however, is produced inadvertently and, within the limitations of present-day machines, is largely impossible to avoid. It would be more reasonable, it seems, to consider this left-over material as residue that might be manufactured into valuable products if techniques for doing such were developed and made known.

Each year the lumber producing industries throughout the United States produce 2.87 billion cubic feet of wood residue material. With our annual cut of timber in the vicinity of 6.7 billion cubic feet, the wood residue that is produced amounts to 43% of the volume of wood material removed from forest lands during logging operations. It is significant to note, as shown by Fig. 1, that better than 17% of this total amount of manufacturing residue, in the form of sawdust, shavings, and other fine materials, is not used in any manner.

Disregarding that portion of wood residue that currently is used for fuel, and that portion in the form of slabs, edgings, and trimmings, the total wood residue that is available for conversion into usable products would be sufficient to support an annual production of up to 7 billion square feet of ¼-inch consolidated board product. If conversion of this material was effected in an economical manner that enabled production of products that were competitive in price and physical application with existing fibre boards, the realization of only a small percentage of this potential output could have significant effect on existing industry and markets.

One important factor with regard to the availability of the described residue material is that the aggregate amount is distributed throughout the country among a great many producing mills, the preponderance of which actually are small in size. A situation thereby exists that makes it desirable for any process of conversion to be one that is adaptable to small scale installation.

The process described in this article is one that can be installed as a small plant establishment with a limited outlay of capital. In this respect, it is unique. A well-known handicap to conversion of industrial by-products into useful goods is the high cost of

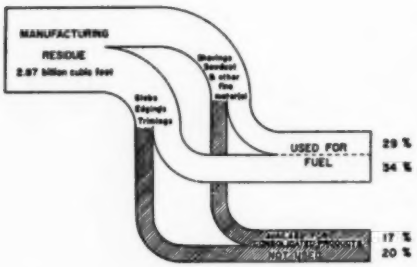


Fig. 1. Percentage breakdown of manufacturing residue by types and end uses.

providing the necessary plant and equipment. The fiberboard industry, for example, has suffered restrictions in expansion and application of products because of these associated high costs. It was with consideration of this situation in mind that the Oregon Forest Products Laboratory embarked upon an investigation designed to develop a process and techniques that would fit the pocketbooks of small wood products concerns. The results of that work constitute the background for the recommendations contained herein.

A variety of end products can be manufactured if the recommendations provided in this article are offered appropriate consideration. Flat board materials, molded shapes, and laminated products (using resin-bound wood particles as a core material) can be fabricated so as to encompass a wide range of density, strength, water resistance, shape and appearance. Not all of the foregoing possibilities are described in detail, but sufficient information is provided to enable intelligent consideration of those factors that might be involved in the manufacture of any one item.

Wood As A Raw Material

Planer shavings, residues from stickers and similar equipment found in wood fabricating plants, residues from furniture factories and residues from plants using turning and shaping equipment all can be regarded as suitable raw materials for the manufacture of consolidated resin-bound products. These materials can be used directly without refining, with the exception of controlling moisture content value and maintaining consistency in size of particles. Control of these two factors is mandatory in order to insure uniformity of physical properties in the end product. Otherwise, it may be considered that in a dry process technique using a thermosetting resin binder, the nature of the wood particles is not critical.

The moisture content of wood particles should be controlled at an optimum value of about 4.0%. This can be accomplished through the use of standard drying equipment. Devices that are suitable for drying shavings and similar materials are currently available and are capable of drying to any desired value from an initial moisture content that may be above the fiber saturation point. Drying materials of this type is not difficult, and can be accomplished rapidly, since the amount of surface area exposed to the controlled drying atmosphere is large in relation to the total volume of each particle.

A higher or lower moisture content value might be as satisfactory as the prescribed optimum of 4.0%, provided it is held constant, and provided correction is made during the operation of resin coating for the amount of moisture in the wood particles. Factors which determine the amount of moisture that can be tolerated in a mat are associated largely with the operation of hot-pressing; these will be described more fully in subsequent discussion.

The strength properties of a consolidated product, as well as the economies of its manufacture, are dependent

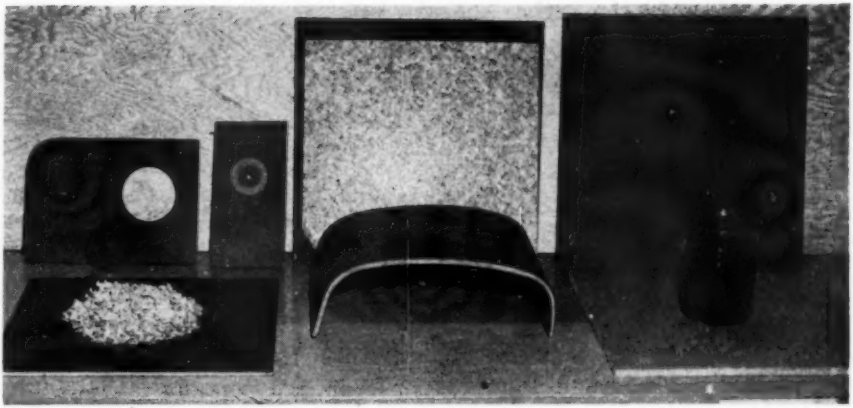


Fig. 2. Evidence of the variety of products that can be manufactured through proper combinations of wood particles and liquid resin binders.

on a proper relationship between size of particle and resin content. A variation of the size of particles being exposed to resin coating treatment, without associated adjustment of the amount of resin being applied, will result in a finished product that lacks uniformity in strength and appearance. This is due to the fact that a given quantity, by weight, of large wood particles has considerably less aggregate surface area to be covered with resin than is possessed by an equal volume of small sized particles.

Considerable leeway is possible in determining an optimum size range of particles. Materials like sawdust have the disadvantage of possessing large surface areas per unit volume, thus they require excessive quantities of resin in order to establish desirable strength values. Very large particles introduce problems of resistance to densifying under pressure. They also present a problem through the difficulty encountered in adequately coating their entire surface areas with binder. Exploratory investigation has given indication that moderate particle sizes are most satisfactory. An exact range has not been established, but an acceptable classification should include material that will have a minimum mesh size of 0.05 inch and a maximum mesh size of 0.25 inch.

Species of wood from which raw material is derived have an influence on the properties of the finished product. Strength properties vary with the bonding qualities of different species. End product density will vary with the density of the species being utilized. It also will vary with the size of particles. Woods with high volatile contents, such as cedar, respond differently to hot-pressing and have varying degrees of compatibility with resin binders. On the whole, though, residue material derived from most commercial woods can be made satisfactorily into consolidated products.

Resin Binders

Physical characteristics of resin-bound materials are derived from the quantity and quality of binder that is used in their manufacture. The quantity of resin binder used ordinarily is expressed as a percentage of the total weight of the final product. In

Fig. 3. Assembling an experimental board having a resin-impregnated paper face. The forming box was used for laboratory work and is not necessary with production equipment.

most cases, this value is determined on the basis of solids content of the resin under consideration.

A study of the effect of variation of resin content showed that a board of acceptable quality could be made with a resin content of about 2.5%. Progressive depreciation of strength, water resistance, and other physical characteristics took place as resin content was decreased to 2.0% and lower. Improvement of physical qualities was realized when resin percentages were increased above 2.5%. Improvement tapered off rapidly as higher resin percentages, in the vicinity of 6% and greater, were used.

With the range in particle size used in our experimental work, a resin content of 2.5% appeared to give a complete surface coating of each individual particle with resin. Therefore, virtually no voids or areas without interfacial bonding of contacting particles existed in the finished product. At binder values of less than 2.6%, voids did exist; strength was reduced and transfer of moisture was facilitated between particles. As resin percentages were increased above 2.5%, each particle received a thicker coating of binder, which resulted in improved adhesion between particles and was manifested in an improved board product. As resin content was further increased, the maximum strength of the resin itself was approached, with the result that improvement tapered off.

Satisfactory application of low percentages of liquid resin mixtures to dry wood particles is difficult to accomplish by means of mechanical mixing. High resin concentrations are usually produced at the point of introduction of the resin to the mix, while succeedingly smaller amounts of resin in the material surrounding the areas of high concentration serve to contribute to a lack of uniform distribution. The hygroscopic nature of dry wood aggravates this situation by absorbing moisture from the resin mixture, thereby retarding resin diffusion to all wood particles. Also, wood particles in the region of high resin concentration become thoroughly impregnated with resin, which is not necessary or desirable from the standpoint of obtaining maximum physical properties in the end product.

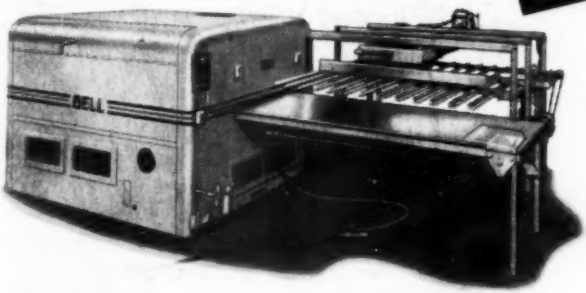
The difficulty of obtaining an even coating can be overcome by use of a spray coating process. Our experimental activity led to the development of a spray coating tower in which an aqueous solution of resin binder is sprayed upward in a direction counter-current to a flow of separated wood particles. Separation of particles, which tend to cluster together, is accomplished by introducing them into a chamber in which a series of baffle plates and compressed air streams provided necessary mechanical agitation. A continuous discharge of free-suspended particles from this chamber falls at low velocity

Just push a button... the "300" gives you

Perfect Bonding Every Time!

PRESSURE
1 Automatic cycle begins with air pressure applied to top and sides of batch.
"BREATHER"
2 To correct "locking" of uneven stock top platen raises, allowing full side pressure.
PRESSURE
3 Warped stock is held flat . . . heat from solid platens cures glue in entire panel.
RELEASE
4 Cured panel is forced out by next batch, ready for immediate machining.

THE Bell No. 300 Electronic Gluer is designed to take care of problems *automatically!* Its short "breather" (see panel 2) takes care of variations in thickness . . its pressure points allow for variations in panel width . . . and it has the only dielectric generator with automatic tuning! The result: consistently good joints, uniformly bonded. Visit the Bell Machine Company and see the "300 demonstrated, or write for literature.



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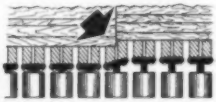

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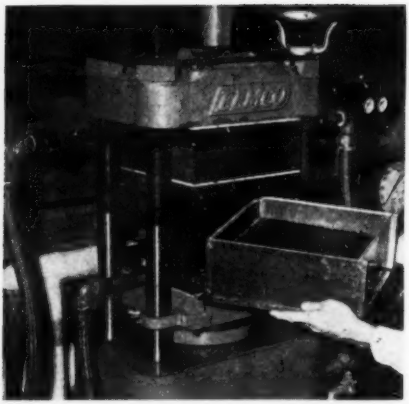

Fig. 4. Laboratory type press being loaded with a board assembly prior to cold matting. After matting the board will be removed from the forming box and hot-pressed.

through a lower coating section and, in so doing, picks up a surface coating of resin binder.

Additional advantage may be gained through the use of such a coating device by virtue of the fact that it enables depositing the resin coated particles directly onto a traveling layup belt positioned under the discharge end of the tower. This feature when correlated with the addition of moisture through the application of resin binder solves the problem of felting and cold matting.

A techique of spray coating permits independent control of both moisture application and resin application. Because of this feature, it is possible to process material, within the physical limits of such an apparatus, to any value of moisture content and resin content that might be specified. The use of water-soluble phenol formaldehyde resin is recommended in order to provide this control. Various mixtures of resin and water, on a volume basis, ranging from 1 part of water with 2 parts of liquid resin, to as much as 4 parts of water and 1 part of liquid resin, may be used, depending on the moisture content and resin content desired for the coated particles.

Pressing

Attainment of desired physical characteristics in a product made by consolidating mixtures of resin and wood particles is as dependent on the technique and condition of pressing as it is on the nature of the raw materials themselves. In virtually all cases where synthetic resins are used as binders, pressing at elevated temperatures and pressures is mandatory. The technique of pressing, in most cases, amounts to establishing a proper correlation of time, temperature, and pressure with the type of resin binder, type of wood particle, amount of free moisture present, and the desired end result.

Time and temperature requirements are interrelated to the extent that resin binders require specific amounts of heat for given periods of time in order to attain a degree of condensation (cure) that results in a permanent bond. Heat has a catalytic effect on the rate of condensation of all thermosetting resins. Therefore, to realize cure throughout the thickness of a consolidated product, it is necessary to reach a predetermined degree of temperature throughout the layup. The recommended temperature for most synthetic resins is around 250° F. at the mid-thickness of the material being pressed. The time required to reach the desired mid-thickness temperature establishes the press cycle time.

The amount of pressure that must be applied to a layup during hot pressing is determined by the qualities of strength, density and appearance required in a finished product. Generally speaking, low-pressure applications result in low density, moderate to

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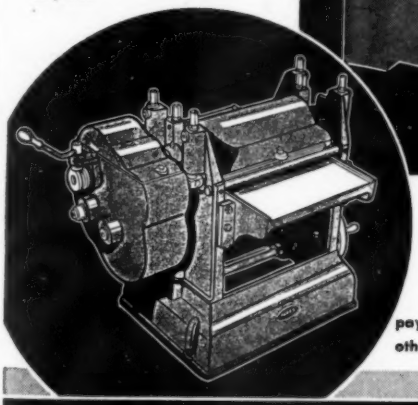

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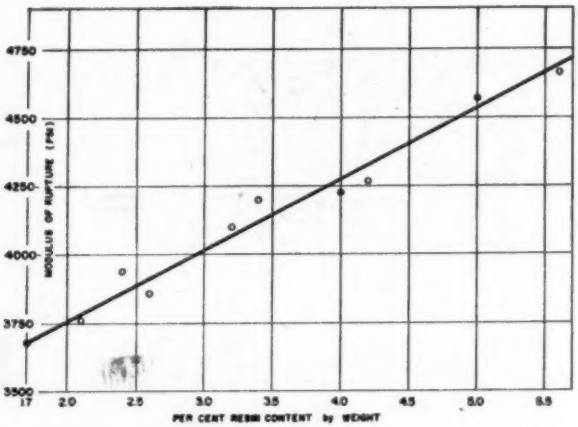


Fig. 5. Modulus of rupture of spray-coated ¼" wood residue board faced with a resin-impregnated paper and bonded with phenol formaldehyde resin.

Fig. 5

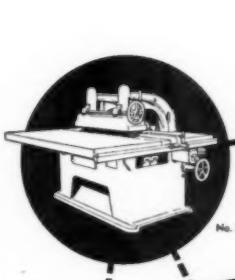
poor strength, and poor moisture resistance. These characteristics may be altered to a considerable extent, however, by the type and amount of binder that is used. Application of high pressures results in improved physical qualities. A range of pressure up to 200 pounds per square inch may be considered low for the production of a hardboard material. Pressures ranging from 200 to 600 pounds per square inch are desirable for most particle board products. Die-pressed materials have been made from wood particles with pressure applications reaching 5,000 pounds per square inch.

Flat board products that were tested and evaluated comparatively during the conduct of the laboratory investigation were pressed at standard conditions of 300° F., and 300 pounds per square inch, for 10 minutes. Boards were cold-flushed at the end of the press cycle as a means of avoiding surface blisters. Cold-flushing amounted to running cold water through the steam platens until they had cooled to a point below 212° F.

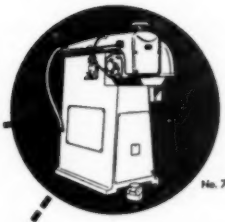
The problem of cold matting resin-particles was investigated in considerable detail. Unlike wet-process fibre mats, dry-process wood material has little if any tendency to hold together prior to the application of external pressures. It was found that by adjusting the moisture content of particles comprising a mat to a value of between 10 and 35% of the weight of dry shavings, preferably between 18 and 27%, it is possible to pre-press the mat cold, using relatively simple equipment, until it is consolidated sufficiently to be self-sustaining, that is, it can be handled. A pre-pressed mat produced in this manner, through accurate control of moisture content values, may be handled by ordinary methods and equipment when cutting it into suitable lengths, transporting it from the felter to the hot press, and introducing it into the latter.

Faces

Although unfaced consolidated board products are attractive and possess satisfactory physical qualities, the addition of faces to both surfaces generally results in an improved product. Excellent results have been ob-



No. 730 Rip Saw



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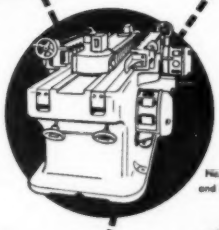

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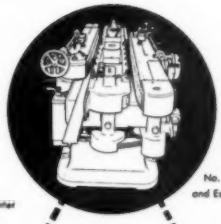

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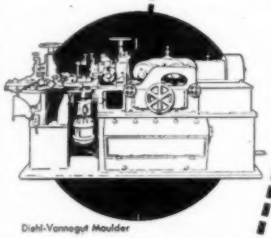

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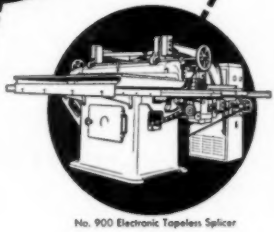

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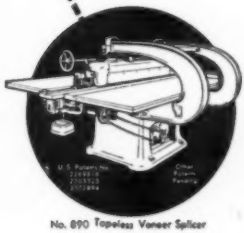

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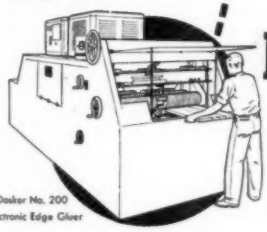

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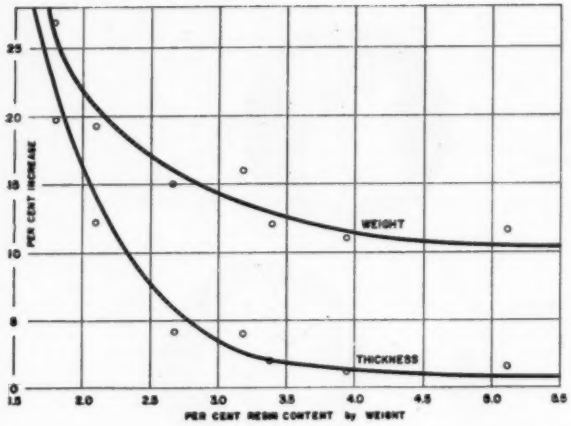

Fig. 6

Fig. 6. Water absorption after 24-hour soak of spray-coated wood residue board ¼" thick, faced with resin-impregnated paper and bonded with phenol formaldehyde resin.

tained with resin-impregnated paper, kraft paper, sliced veneer, rotary-cut veneer and cloth. It is probable that satisfactory results could be obtained with sheet plastics and thin metals, provided adequate surface-bonding adhesives are used. The fact that these materials can be applied as faces at the same time that the core material is being consolidated under heat and pressure is of particular advantage from the standpoint of facilitating production.

Sliced and rotary-cut veneers make extremely attractive faces for consolidated cores. It is possible to produce a minimum-cost product faced with mahogany, walnut, or other decorative veneers. These products, when made in the desired thickness, may be used wherever hardwood plywood or lumber core stock is currently being used. It is mandatory to use a balanced construction when veneers are used for facing. Although it is preferable to use a two-ply face, with the grain of adjacent veneers oriented at right angles, a single ply can be used.

Face materials must be coated with adhesive on the surface adjacent to the core. At low resin contents there is not a sufficient quantity of free binder in the core to provide adequate bonding of uncoated face material. Experimental results indicate that a sprayed coating of about 2.5 pounds of resin solids per 1000 square feet of veneer will provide adequate bonding between core and face when the core resin content ranges from 2.5% upwards. Adequate bonding of paper can be obtained with about the same resin application as that specified for veneer. Cloth, on the other hand, requires a considerably greater spread in order to provide sufficient resin to fill the interstices of the material. This requirement will vary with different types of cloth.

Steam accumulation between faces and core composites presents a problem during hot-pressing. It has been found that resin-impregnated papers and similar impervious face materials are more susceptible to this condition than veneers, fabrics and other materials that allow steam accumulations to dissipate by diffusion. To overcome the difficulties associated with this condition, heated platens should be cooled to a point well below 212° F. before

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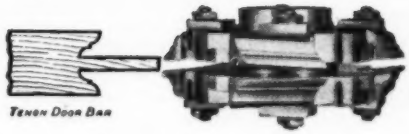

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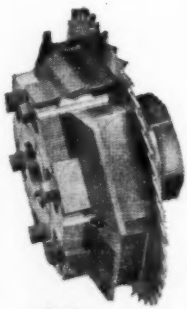

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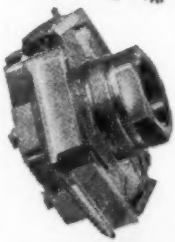

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hydraulic pressure is released from the assembly. Steam pockets are more likely to develop when platen pressures are increased. Experimentation is the only way in which to determine the actual need of cold-flushing. With certain face materials, the rate of escape of steam from the assembly may be sufficient to obviate its need.

Die-Shaped Products

With the use of properly constructed dies, resin-coated wood particles can be formed into shapes of simple or compound curvatures. Products, such as wheels for toy automobiles, blank shapes for toys, coasters for glasses and knife handles, can be formed in plunger-type dies. Other products designed to conform to simple curvatures, such as packing carton separators, waterfall shapes for furniture, kitchen cabinet ends, molded baseboards for home construction, cove molding and clock cases, can be made readily either with or without face materials.

Plunger-type dies should be constructed with sufficient clearances to permit the escape of water vapor as it diffuses from the material being pressed. It may be desirable to provide a cold plunger die of rough dimensions for instantaneous application of pressure to form mats (or blanks) to be fed into a more accurately made heated die. In lieu of provision for cold matting, sufficient plunger travel should be allowed in the hot die to permit at least a 16-to-1 ratio for compressing loose material into a consolidated state. This same compression ratio must be allowed for in a cold matting die. Variation of particle size can affect this ratio to a considerable extent.

Products molded to simple curvatures and faced with veneer or other face materials can be produced with relative ease and economy. Experi-

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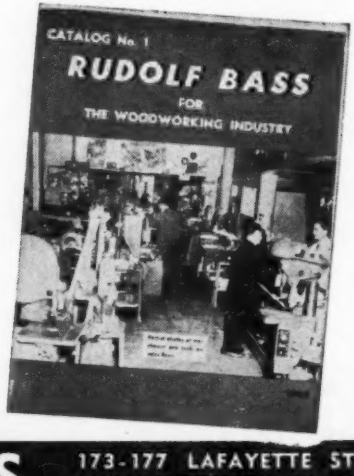

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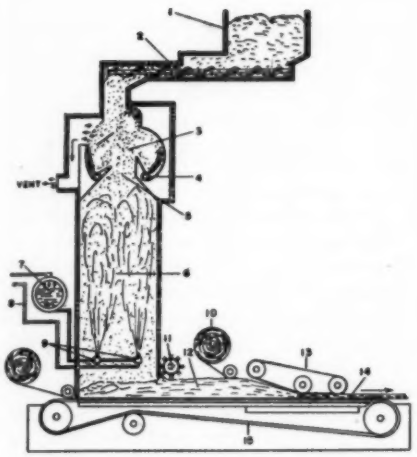

Fig. 7. Spray-coating apparatus for coating particles of wood residue with bonding resin. 1. Hopper, 2. constant weight feed mechanism, 3. baffle section, 4. air jets, 5. throat of coating chamber, 6. coating chamber, 7. pressurized reservoir for binder, 8. compressed air line, 9. spray nozzles, 10. face material, 11. leveling picker, 12. loose mat, 13. metal belt for pre-pressing, 14. cold pressed mat, 15. conveyor.

mental molded units were made ¼-inch in thickness, with a 90° bend on a 2-inch radius. Various units were faced with "Kimpreg" grade 3000 resin-impregnated paper, sliced mahogany veneer, sliced walnut veneer, kraft paper, and left unfaced, all with fully satisfactory results.

Development of pressing technique enabled the use of fixed-center dies of standard design, a type generally used in the manufacture of molded plywood. Layups of desired size were pre-pressed in a manner identical with that recommended for the production of flat board products. Self-sustaining cold-pressed mats then were inserted between the opposed elements of the die. Spring brass cauls were used on both

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surfaces to provide retention, thereby avoiding possibility of mat disintegration during the period of die closure. If veneers or other rigid face materials are incorporated in a layup, the use of cauls is not necessary.

A recently conducted survey of the television and radio cabinet industries evidenced considerable interest on their part for molded shapes. In some respects molded plywood has features that are superior to those possessed by products molded with wood residue cores. This superiority is quickly forgotten, however, when the present price in the range of 50 cents per square foot for molded plywood is compared to an estimated price of less than half of that for a molded product made from wood residue material and faced with quality veneers.

Physical Properties

Unfaced products have a unique, attractive surface appearance that might be considered desirable for certain decorative or architectural applications. The characteristics of the surface are influenced by the amount of resin binder used and by conditions of pressing. Incorporation of high percentages of phenolic binder (roughly 5% or greater) results in a decided darkening effect on the color of the wood particles; it also produces a surface glaze that may be desirable in some instances. The effect of pressure is manifested in compactness or hardness of the product. The size of wood particles used contributes to appearance. Small particles produce a homogeneous-appearing product, while large particles retain their individual identity, thereby producing an attractive design.

Modulus of rupture values drop sharply with resin binder contents lower than 2%. As resin content is increased above 2%, strength values tend

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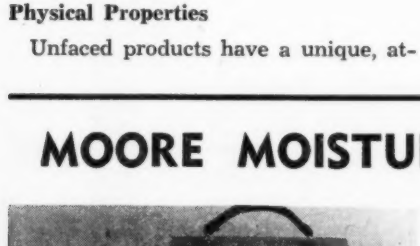

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to improve proportionately. At approximately 6%, improvement in strength tends to taper off. This is attributed to the fact that the maximum strength of the binder resins begins to affect the modulus of rupture near this point.

A correlation exists between strength and moisture content at time of pressing. From the standpoint of obtaining maximum strength, total moisture content should be held in the vicinity of 25%. As moisture content decreases, the modulus of rupture decreases; roughly, a 20% decrease in value of rupture can be expected when the moisture content is at or below 12%.

Fig. 5 shows the range of modulus of rupture values for various percentages of binder content. The values were obtained by testing ¼-inch thick specimens in conformity with the procedure outlined in Federal Specification LLI-F-311, Fiberboard, Hard.

Since resin binders are costly, it is desirable to determine a point at which the economics of product manufacture can be balanced against use requirements. Our investigation led to the conclusion that a resin content in the range of 2.5 to 3.0% should be considered as an optimum. It is true that improved strength can be obtained with higher resin contents, but the improvement is not consistent with the increased costs of manufacture that would be incurred. Certain specialty items that bring a high market price may warrant the addition of more binder material.

Water Absorption

With optimum resin content (2.5 to 3.0%), the water absorption characteristics of consolidated boards compare very favorably with those of hard fiber boards. At resin content values of less

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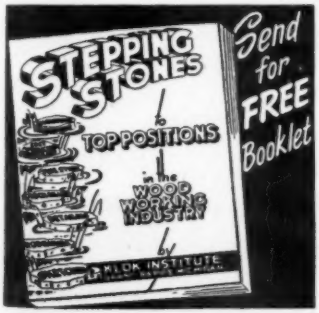

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than 2.0%, the rate of absorption during a 24-hour soak period was relatively high. Excessive resin, above 3.5%, adds little if any improvement to water absorption characteristics. Water absorption by specimens having various percentages of resin binder content is shown in Fig. 6. The values indicated will be influenced to an extent by the nature of face overlay materials. Impervious overlays will keep moisture from penetrating to the consolidated core, and thereby reflect their qualities through making the entire assembly more resistant to moisture pick up. It should be noted that the particular resin-impregnated face material used in our work did not materially affect the rate of water absorption. Unfaced materials can be expected to react a little less favorably to the same exposure.

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ties of manufacturing products from wood residue materials have stressed the importance of cost. For this reason, we will undertake a review of the factors that must be considered in a preliminary cost analysis. Let us assume that we wish to build a pilot plant that will be capable of producing a ¼-inch thick board product having a binder content of 3.0%. An additional assumption will be made that the plant will be equipped to produce a variety of board products; insofar as face overlays are concerned. It is practical, as explained in previous discussion, to face boards with a variety of materials, including rotary cut veneer, sliced veneer, and resin-impregnated paper. The physical properties of a board with resin-impregnated paper may be considered as being representative of those faced with other materials; the maximum departure amounting to a 20.0% reduction in modulus of rupture for unfaced boards.

Table I provides a summarization of the important physical characteristics of a board having a resin binder content of 3.0%:

The major item of capital outlay is the plant establishment. Equipment designed to enable production of 5,000 square feet of board per eight-hour day would require an approximate expenditure of $25,000. The equipment considered in arriving at this figure would include: (1) a 4-foot by 4-foot, ten-opening hot platen press designed to operate at 300 p.s.i. hydraulic pressure, and capable of developing a platen temperature of 300° F.; (2) a drier for equalizing moisture content value of wood particles; (3) a spray coating apparatus; (4) facilities for preparation of face stock, and (5) miscellaneous equipment for materials transfer, siz-

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TABLE I. Properties of ¼-Inch Consolidated Board Faced with Resin-Impregnated Paper

Specific gravity	0.9
Modulus of rupture	4,000 psi
Tensile strength	1,850 psi
Water absorption (24-hr. soak)	14%
Water absorption (ten cycles, 24 hrs. each)	25%
Moisture pick up (96-hr. exposure to 88% RH, 120° F.)	2%

ing, etc. Design of the plant could be developed to take advantage of the automatic features inherent in the process equipment described in subsequent discussion. Exploitation of these features should permit operation of a pilot unit with as few as five men. A pilot operation producing 5,000 square feet of finished product would require processing 2.5 tons of residue material per eight-hour day.

Daily raw material requirements can be divided into three units: resin binder, face material and wood residue. Assuming an average cost of 25 cents per pound (solids basis) for resin, 2.5 cents per square foot (each surface) for paper or overlay veneer, and $1.50 per ton for wood residue, total raw materials cost would be roughly 5.75 cents per square foot of finished product. Labor and overhead, based on a figure of $4.00 per man, to be inclusive of wages, power, depreciation, maintenance, etc., would be 3 cents per square foot. A figure of 8.75 cents per square foot thereby is arrived at on the basis of limited output available from such a pilot plant establishment. The economies of operation possible in a full scale plant should allow substantial reduction of this figure.

Process Equipment

The procedure of making a satisfac-

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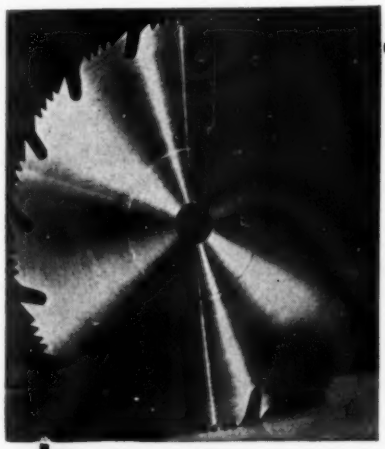
tory product through the combination of synthetic resin binders with dry wood particles resolves into a problem of properly combining the two materials. As has been shown, the application of resin to wood particles must be accomplished in such a way that homogeneous coating of the surface of all particles is realized. At the same time, positive control of the amount of moisture that is added and the amount of resin that is applied must be maintained. Unfortunately, these requirements exceed the limitations of ordinary methods of mixing ingredients by mechanical means. It has been determined, however, that satisfactory coating can be achieved when separated wood particles are exposed to an atmosphere of sprayed resin binder.

A resin-coating device is shown in schematic view in Fig. 7.

When properly separated, individual free-suspended particles drop by gravity through the lower section of the coating tower. During this drop they pass through an atmosphere of atomized resin-water mixture, and by so doing, collect a deposit of binder on all exposed surface areas. Control of the amount of resin that is atomized is obtained by adjustment of air and mixture pressures. The ratio of resin to water in the atmosphere of atomized binder, the factor that determines final moisture content of the coated particles, is adjusted by diluting the neat-resin.

The rate of feed of wood particles through the apparatus, when coordinated with the amount of resin being atomized within the coating chamber, determines the final resin content of the coated material. After being coated



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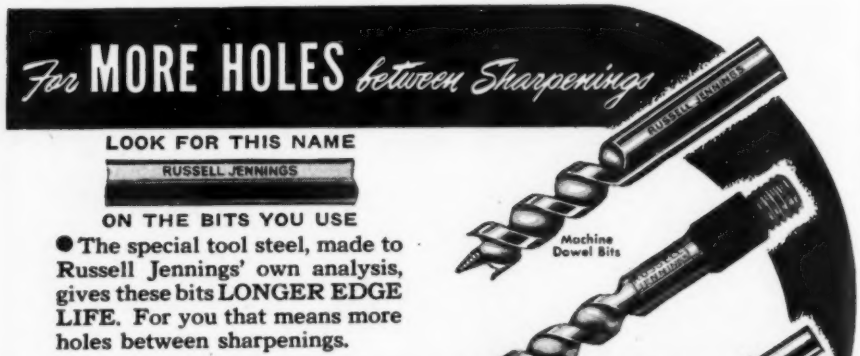
with binder, the particles pass out the bottom of the chamber which is open to the atmosphere and positioned above an endless conveyor. Coated particles deposited on the conveyor are passed beneath a picker roll, thereby forming a mat of density and dimensions suitable for consolidation.

Face materials may be introduced under the discharge end of the coating chamber by means of the endless conveyor belt. Paper or cloth facing that has been coated with a suitable adhesive on the side that is to be in contact with the deposited mat may be fed from rolls as indicated in Fig. 7. Other means may be devised for feeding veneer and similar face materials that cannot be handled as conveniently as paper. After a mat has been deposited on the bottom face, a top face may be applied to complete the assembly. Following the introduction of both faces, the assembly can be pre-pressed by means of a traveling metal belt or some other device.

Mechanical Methods of Cutting

It is possible to coat wood residue particles by mechanical means. The major limitation lies in the fact that a considerable amount of costly equipment, requiring heavy maintenance, is necessary. In general, proper diffusion of resin can be accomplished by beating, such as would occur when a constant feed of a mixture of resin and wood particles is passed through several stages of hammermilling, or in a batch proprosition wherein the resin-wood particle mixture is tumbled in rotary machines. A disadvantage of this type of processing is that separate facilities must be provided for felting of coated particles. In both of these techniques, resin usually is introduced into a flow of wood particles by means of a controlled drip. Percentage of resin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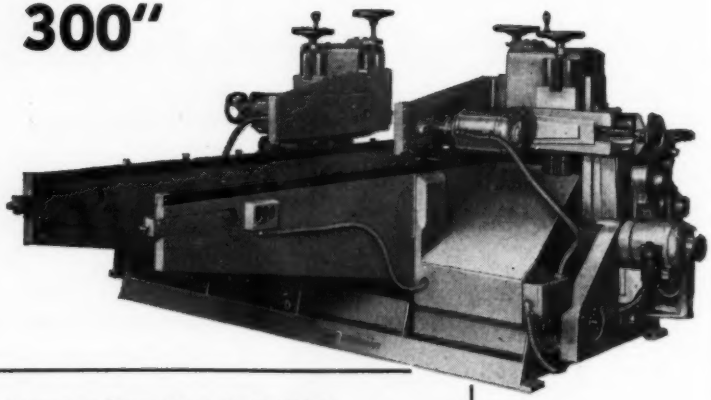

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Recent
DEVELOPMENTS IN CONTAINERS

BY W. BUTTERWORTH

THIS PAPER deals with shipping container developments during 1949 at the Ottawa Laboratory of the Forest Products Laboratories of Canada. No very sensational or revolutionary developments can reasonably be expected in a field so widely covered as is the construction of shipping containers. They have been used so widely and so long that the bulk of "new" developments must of necessity be small improvements of detail or the adaptation of known principles to new uses.

Style 7-Box

This is a style of construction proposed by the laboratory in a draft specification for wooden boxes submitted to the Canadian Standards Association. It was designated Style 7. There is nothing revolutionary in this design yet there is evidence, both from actual use and laboratory tests, that this design has merit. It is not in current use to any extent though it is thought that for many purposes the box or one of its modifications would be much more satisfactory than any other conventional style.

This box (Fig. 1A and B) appears superficially to be very like several other variants but it is thought to be better in certain respects than any of these other related types. One such variant (Fig. 1C) was described as long ago as January 1932, in an amendment to the "Ready Reference Manual—Wooden Box and Crate Construction," prepared by the National Association of Wooden Box Manufacturers, Chicago. That style was put forward as a pilferproof box and it would appear that the object of the design was to cover the ends of every board in each panel to prevent any board being slid out. Style-7 box is constructed rather for mechanical ruggedness. It will be noted that the design is such that every board is held on the outside by a cleat and on the inside by an adjacent panel, so that the clinch nails have little work to do except hold the panel together until assembly is complete. Fig. 2 also shows another variant in which only the clinch nailing prevents a board being driven into the box by an external blow, although it incorporates the same "pilferproof" feature as is shown in Fig. 1C. Either of the boxes shown in Fig. 2 have an advantage over that in Fig. 1C in that the cleats only enter the three-way corner and consequently nails used may be shorter by the thickness of the boards in the panel. Fig. 4A shows clearly how nails or screws are grouped in threes at the end of each cleat, one nail being driven at right angles to and between the other two nails. This arrangement of nails appears to produce great strength as every external force

Mr. Butterworth is with the Timber Mechanics Division, Ottawa Laboratory, Forest Products Laboratories of Canada.

This paper, published by permission of the Forest Products Research Society, describes a style of wooden box with cleats in three-way corner construction; two types of re-use container; and a program of work to develop molded staves for use in the cooperage industry. The wooden box is very robust and economical; its strength allows use of thinner lumber. A number of examples of its use are described. The re-use containers are cleated plywood boxes and incorporate new features for easy opening and closing without the use of tools. The work on tight cooperage is aimed at developing an economical method of molding standard staves. This will make a barrel demountable and facilitate shipment for re-use.

can be resisted by a nail in shear. There is no evidence of nails working loose in transit. This feature can be achieved with either of the boxes shown in Fig. 2, though not with that shown in Fig. 1C.

The features incorporated in this Style 7 box which appear to recommend it beyond all others for heavy or difficult loads are: (a) The use of the three-way corner throughout; (b) All nailing is into the side grain of the wood; (c) The locking effect produced by the cross-nailing at the ends of the cleats; (d) Boards making up the panels cannot be driven into the box by an external blow; (e) The advantages of prepared panels which may be made up and stored until required; (f) The high degree of rigidity obtained with the three-way corner and edge cleats.

Several opportunities arose to test this design of box in service and the descriptions that follow will give a better appreciation of the design than any further general discussion.

Stacked Paper Maps

A request for seven boxes suitable for carrying large maps, stacked flat, provided the first opportunity to use the new style box (see Fig. 3.) The maps were being shipped to be trimmed and bound. Stacked paper is not an easy load to carry. There is a tendency to flex and the stack itself tends to shear or slide. The stacks measured somewhat under 30½ inches by 24½ inches by 12 inches high, and the weight was approximately 270 pounds. A box which could strongly resist the tendency to

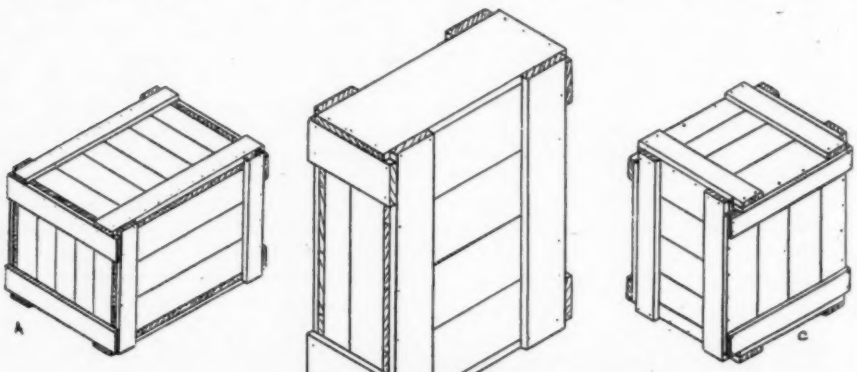

Fig. 1. A, Style-7 box; B, modified Style-7 box; C, Style-A pilfer-proof box.

Fig. 2. Note that the ends of the sheathing boards in the left-hand box are flush with the edge of the cleats and overlap the edge of the adjoining panels and thus cannot be driven into the box.

bowing of the large top and bottom faces, with a consequent straining of the nails, was necessary to carry such a load.

The boxes were constructed from ⅝-inch spruce and the inside dimensions were 30½ by 24½ by 12 inches. Little space was available for packing, but since the maps required further trimming at the bindery, slight damage to their edges would not be objectionable. Panel boards were nailed to the cleats with 1⅜-inch duck-billed clinch nails. The panels were assembled with cement-coated box nails, 2¼ inches through the ends of the cleats and battens, and 2½ inches through the edge cleats into the side grain of the boards of the adjoining face.

A subsequent order for more boxes of this same type was indication of satisfactory service.

Electric Switchboard

An electric switchboard, packed for shipment to northern Manitoba, provided the second practical test for this new style box. Due to the manner in which it had to be supported in the box, this switchboard was a difficult load to carry. It was mounted on two 1-inch pipe standards with elbows at their ends, coupled to floor flanges with close nipples. The switchboard measured just over five feet in length and could only be supported at the extreme ends because of the instruments at the front of the board and the wiring and projecting connections and switches at the rear.

Protection for the switchboard during transit had to provide against the hazards from heavy articles being laid

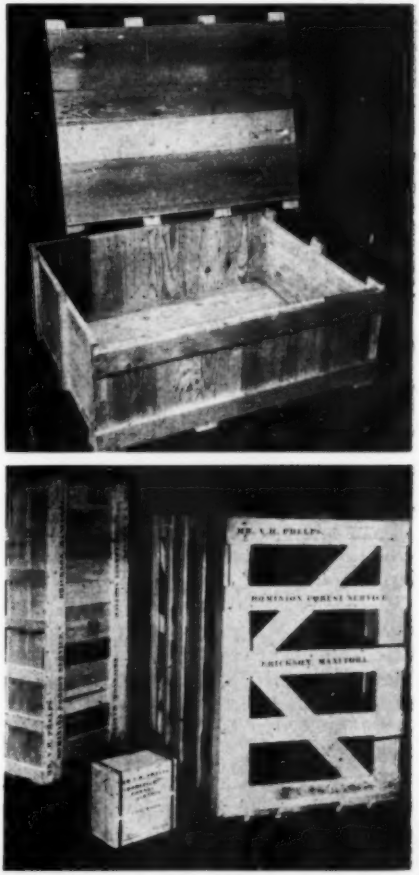

Fig. 3. Above: box designed to carry flat paper maps. Note top and bottom cleats to prevent bowing. Below: left, box designed to carry electric switchboard.

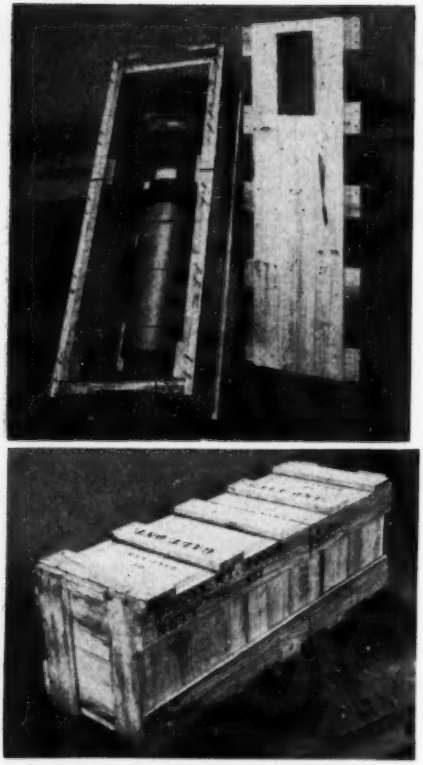

Fig. 4. Box used to pack planer head. Above: interior view showing side blocks used to hold unit down. Lower: box ready for shipment.

upon the box or the use of a roller across its centre to facilitate moving. The rigidity of the box had to be sufficiently high to prevent sagging of the faces in order to avoid fouling the switchboard.

An advantage of Style 7 when a long box is required, is that it permits the use of shorter boards in the top and bottom faces than do any of the conventional boxes. In this way there can be economical use of box grade lumber and defects eliminated which would normally be included in the longer boards required for boxes of Styles 2, 2½, 3 or 4.

The box for packaging the switchboard (Fig. 3) had inside dimensions of 64 by 24 inches by 10¼ inches, and was constructed with ⅝-inch spruce. The bottom longitudinal edge cleats were 5¼ inches wide to provide for bolting down the flanges of the switchboard mountings. Three ⅜-inch carriage bolts were used to fasten each of the four flanges. To simplify cutting of shooks, the top longitudinal edge cleats were the same width as those for the bottom. As a further precaution against bending, the sides of the box were constructed of two boards 65¼ inches long, stiffened by two edge cleats and five vertical battens. Nailing was in the same general manner as that of the map boxes. The cleats were held to the panel boards by 1⅜-inch clinch nails, and 2¼-inch cement-box coated nails through the ends of the cleats and battens, with 2½-inch nails being used to fasten the edge cleats through the side grain of the boards of the adjoining face. The gross weight of the pack was 270 pounds, the tare weight 80 pounds.

A report from the carrier and consignee indicated that the pack arrived in excellent condition and without even the slightest pulling of nails. However, since such a pack would normally be shipped l.c.l., with relatively greater hazards than in carload lots, further modifications to the design merit consideration. Under l.c.l. conditions the possibility of other articles being placed upon the box would be ever present and might prove disastrous to the switchboard should such an article be heavy and dense and cause bowing of the top of the box. In the original box, due to the nearly exhausted nail stocks, the top and bottom panel boards were fastened to the longitudinal edge cleats with one, instead of three clinch nails. Only the end boards of the panels had

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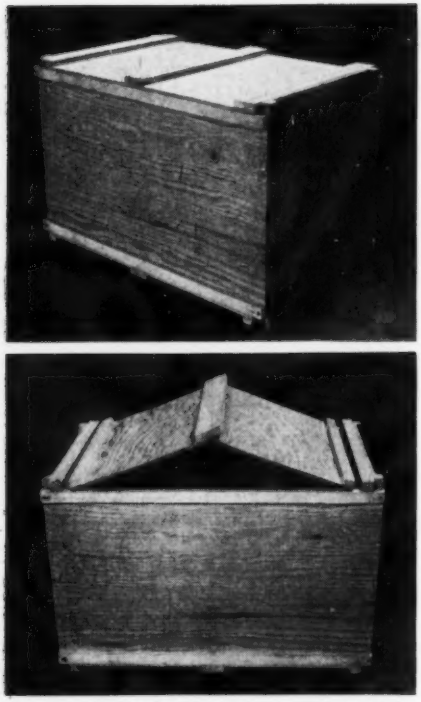

Fig. 5. Parachute shipping container. Top: box closed. Lower: method of inserting lid.

three nails. The clinch nails held the panels together until the box was assembled. To compensate for this deficiency, the 2½-inch cement-coated box nails driven through the longitudinal top and bottom edge cleats should have been so spaced (but were not) that the ends of each panel board would receive at least two nails. A much better arrangement would have resulted if, in place of the two 5¼-inch top longitudinal cleats, two 2¾-inch edge cleats had been used with an added intermediate longitudinal batten of the same width. Considerable stiffening would have resulted and breakage of the top boards would have been less likely in the event of some heavy article being placed or falling on the top of the box during shipment, as the central batten would serve to spread a concentrated load over two or three boards.

Glass Bottles

Five 16-oz. bottles containing sulfite waste liquor and shipped to the Research Foundation of Ontario, Toronto, Ont., provided the third application for this style of box. A much less expensive method of packing than the one used would have provided safe transportation. The consequences in time and trouble, should breakage occur, were such that the low cost of extra protection of a single shipment was justifiable. The bottles were difficult to pack since three were round and two were flat, in cross-section. For this reason, a generous amount of Kimpak, 0.37-inch thick, was used to cushion all faces of the bottles. Excelsior rammed in the top of the box transferred the stresses from the relatively weak bottle necks to the much stronger shoulders of the bottles.

The inside dimensions were 7 inches by 7½ inches by 8½ inches deep, and the box was made up from ½-inch lumber. Panel boards were fastened to the cleats with 1⅛-inch clinch nails. Panels were assembled with 1¾-inch cement-coated box nails. Nailing was at the three-way corners only. The gross weight of the box was 17 pounds. The advantages of the Style-7 box for this purpose were its symmetry and equal strength in all directions. Ample protection was afforded to the contents.

Gallon Tin——Class-B Poison

A modified version of the Style 7 box was used packing a gallon tin of Class-B poison. This box differed from the normal Style-7 box in that one inside dimension, 4⅝ inches, was so small as to make it unnecessary to use both sheathing and cleats at the ends. Had both cleats and sheathing been used, the ends would have been, in

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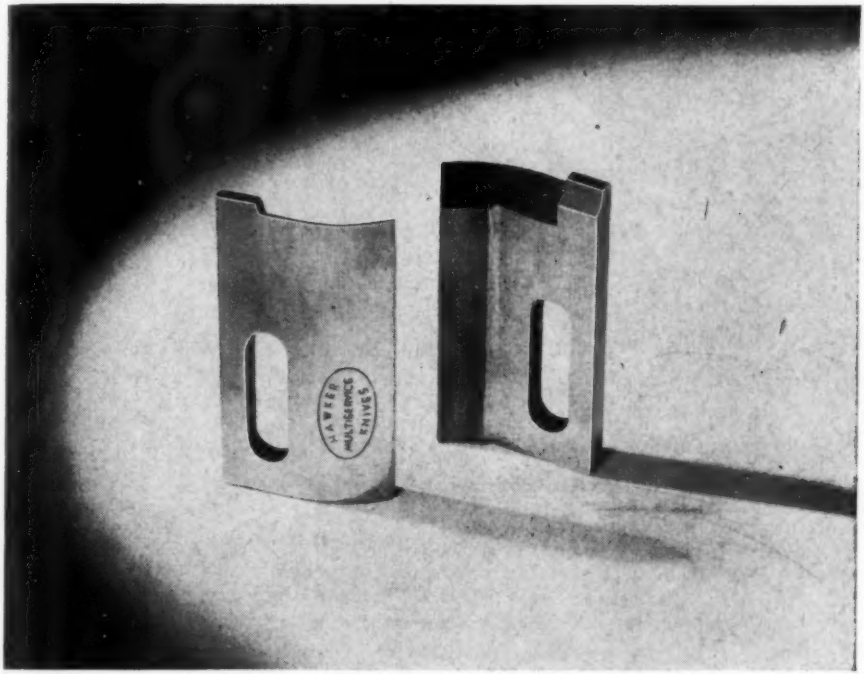

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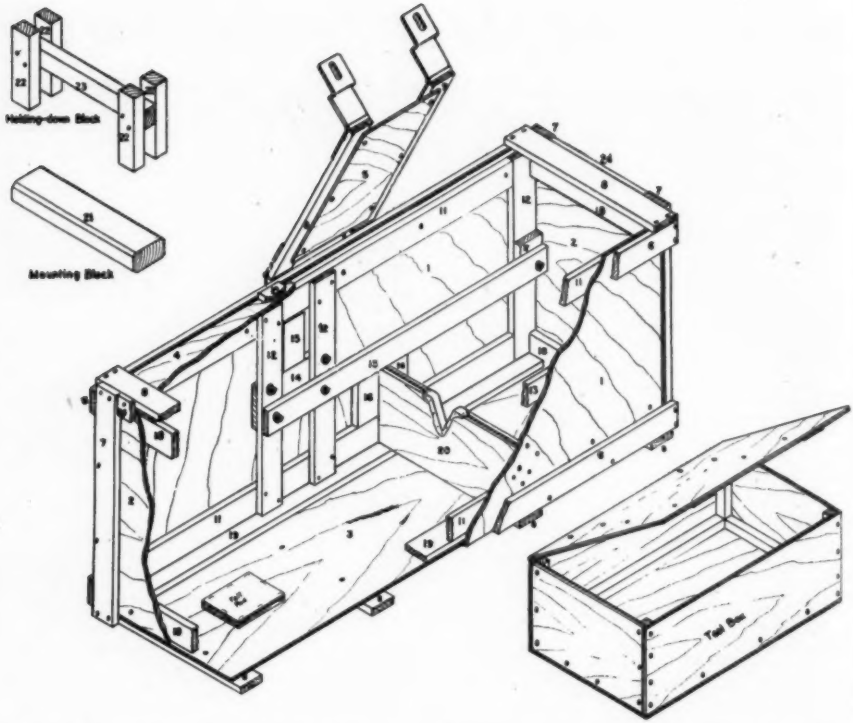

Fig. 6. Plywood case for winter storage and seasonal shipment of outboard motor.

effect, a 2-ply cross-grain construction. Such a box would have a much stronger end than required and one that would be out of balance with the remainder of the box. This modified design would have special merit for boxes where one dimension is small enough for one piece of board conveniently to make each of two panels or perhaps two boards, suitably joined. The application of the design here discussed is not considered as an ideal one, but it does point to possibilities for use. This modified design is particularly adaptable to the requirements for a container for plate glass and other sheet material. It is suitable for fine panelling, polished metal sheets and other material having a high surface finish, and corrugated metal, composition board panels and similar material requiring protection against crushing. For extremely heavy articles, such as flat tombstones, the narrow faces of the box might well be made of 2-inch by 4-inch by 6-inch, or other suitable widths and thicknesses.

The box for the Class-B poison shipment had inside dimensions of 4⅝ inches by 6⅝ inches by 12 inches. Cleats and sheathing were of ½-inch stock, and nailing followed the usual pattern for a Style-7 box. The pack weighed 25 pounds gross and 4½ pounds tare.

The modified version of the Style-7 box will be known as Style 7A.

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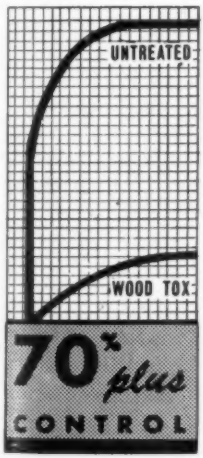

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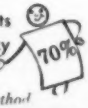

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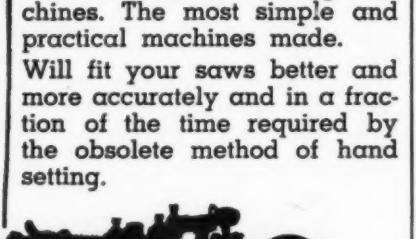

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A wood-planer head, with attached direct drive motor, had to be returned to the maker for repairs. Shipment required a container which would provide adequate protection and insure that shaft alignments were not upset. A Style-7 box was constructed into which the unit fitted snugly end to end. Lateral and vertical movements were prevented by blocking. Inside dimensions of the box were 37¼ inches by 10¾ inches by 10¾ inches. The box was constructed throughout from ¾-inch stock. Fig. 4 clearly shows that the box was constructed in the conventional manner. There was one difference in the assembling of the panels, in that the top was screwed on to provide easy access and prevent damage to the container. It was intended that this box be again used for returning the repaired unit to the laboratory. All nailing of bottom, sides and ends was done with 3-inch cement-coated box nails.

By a simple, yet effective method, the unit was properly located in the box. Two hardwood blocks—grooved to accommodate the 1-inch by ⅛-inch splines in the motor and outboard bearing housings—were bolted to the housings through the bolt holes provided for mounting the planer head and motor to the machine table. A wood strip ¾-inch by 1¼-inches by 9-inches was nailed to the box bottom under the ends of each block to provide clearance for the lower budge of the motor. The blocks for the motor bearing were 1¼-inch by 10¾-inches by 6-inches, and 1¼ inches by 10¾ inches by 3 inches for the outboard bearing. This arrangement supported the unit in its normal operating position. The whole assembly was held down in the box by four blocks, cut from cleat stock, and bearing against the upper surface of the mounting

blocks and the underside of the lid when the box was closed. These blocks, nailed to the sides of the box, may be seen in Fig. 4. The gross weight of the boxed unit was 262 pounds, and the net weight 227 pounds. Because of the eccentric load, the sling point was marked with a black line and stencilled "Sling Here" on the sides and top. The box was shipped by rail to Galt, Ontario, and was used to return the repaired unit to Ottawa. The round trip was one of approximately 600 miles made under L.C.L. conditions. In addition, truck handling was necessary to and from the freight depots. After return to the Laboratory, the container was examined for failures.

Examination first disclosed that the sling marks on the sides and top did not coincide showing that the top had been reversed end for end on the body of the box. Slinging at the Laboratory showed the center of gravity to be at the sling line on top of the box. The conclusion was that the unit had been returned to the box reversed end for end from its original position (Fig. 4). When the box was opened all blocking was found to be in proper position. Evidence of the use of a nail puller to remove the bottom explained the above. Apparently the position of the bottom was reversed end for end when it was replaced, making necessary the reversal of the unit and the box top which carried a pad on its underside to bear against the motor. In replacing the bottom, 2½-inch common nails were used.

Damage sustained by the box located at the end occupied by the motor on the return trip. The boards were cracked mid-way between the cleats. This more than likely was the result of a severe end drop, as might occur when dropped off the end of a truck. The nature of the wood failure indi-

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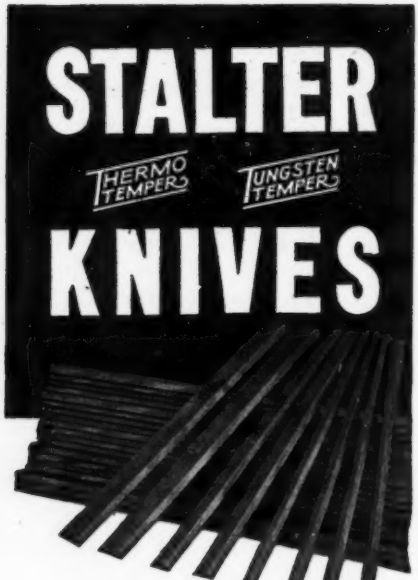

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cated a certain amount of brashness caused by the presence of some compression wood. Examination of the box showed that the end bolts of the motor had sunk into the end boards until the motor housing rested snugly against the wood immediately behind the cleats. This indicated that a further breakthrough was prevented by the cleats. Marks left by the motor at the opposite end of the box show that the failure occurred on the return journey.

The original nailing held remarkably well, and there was no evidence of nail pulling. Even the 2½-inch common nails showed no evidence of pulling, though they were easily removed for examination. This points to the efficiency obtained by cross-nailing, which mainly places shear stresses on the nails and reduces, if it does not entirely eliminate, tension on the nailing. Fig. 4 shows the condition of the box after the return journey.

This failure of one end, which opinion at the Laboratory believes to have been caused by excessively rough handling, points to an unbalanced construction. Further consideration of the design shows the need for a better balance of strength of the sides, top and bottom, compared with the strength of the ends. A better absorption of the end to end thrust would be obtained if the thickness of all members were reduced to ⅝-inch and two inside cleats added at each end to compensate for this reduction in lumber thickness. These cleats should be fitted inside directly behind, and parallel to the end panel cleats. These inside cleats would take the load of the motor housing and leave the ventilator at the end of the housing free from contact with the end panel boards.

With this style of box in mind, but using plywood in place of boards for the panels, two re-use containers were developed. These are thought worthy

of description as they may have wider application than the specialized fields for which they were developed.

Re-Use Containers for Parachutes

Fig. 5 shows a box designed for shipping parachutes. It would be used in the first instance for shipping the parachutes packed ready for use and on this trip the box must admit of some kind of seal that would asure the recipient that it had not been tampered with. In the second place, it would be used to ship a parachute that had been opened, back to the factory for examination and expert refolding. For this latter purpose, it is essential that the box be absolutely smooth finished inside and out so that nothing can snag the parachute fabric. This particular box measures 24¼ inches long by 14¾ inches wide by 15¾ inches deep externally and is of ¼-inch, three-ply plywood. The cleats are ½-inch by ⅞-inch birch and the center battens across the bottom and top are ½-inch by 1⅞-inch birch. The box weighs 13 pounds and the gross weight with main and reserve parachute is 50 pounds.

The box shown is fastened by two screws at each end of the center batten of the lid. The lid is hinged under this batten, the hinge being formed of a strip of canvas glued to the plywood. Fig. 5 shows the method of inserting the lid. The lid is folded sufficiently to allow the ends to pass beneath the top cleats of the box and is then shut down. It may be fastened by screwing as shown, or if filler cleats are provided on the sides, a single girth strap will provide a secure fastening. Another method would be to recess hinged hasps into the underside of the center cover batten. The hasps are bent to fit around the top cleat on the side and close over a staple fixed to the side panels. With this method of fastening a lead seal on a loop of wire can be used.

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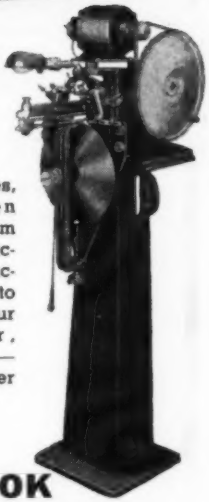

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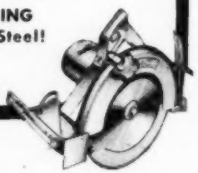

You can't match the quality, the performance or the capacity of this sturdy, lightweight MallSaw at the price! Easy to handle. With Bevel Depth attachment (available at $7.50), it has a capacity of 11/16" to 3" on straight cuts and 45-degree bevel cuts from 5/16" to 1⅞". Choice of right or left hand blade, powerful 115V or 230V AC-DC motor. Blades are available for dadoing, grooving tile, transite, concrete and cutting light gauge metals.

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Fig. 5 shows the box after it had withstood 60 drops in the 14-foot hazard machine and an end-to-end compression load of 11,000 pounds. The compression load was applied in this direction as, on account of the proportions of the box and the position of the lid, this is the weakest direction. The hazard machine test was conducted with main and reserve parachutes but was somewhat more severe than is to be expected in service as webbing straps to retain the parachutes in position had not been provided. On the result of these tests it is thought that 3/16-inch plywood will be adequate but the cleats are about as small as is practicable to hold the screws used for fastening the panels together. The use of the thinner plywood would slightly reduce the weight of the box, which is desirable as air transport may at times be used.

Outboard Motor Box

The other re-use container is of a heavier and more robust construction as a more difficult load is involved and there is no necessity of air transport.

For the use of field parties operating during the summer months in the bush lands of Northern Canada a special box was required to ship outboard motors. The box is used to ship the motors in spring from headquarters in Ottawa to the party's base of operations at rail or road head. Here the box must be opened without tools as these are packed with the motor tool kit inside the box. In the fall the motors are re-packed for return to Ottawa for overhaul and winter storage. The tool box only is carried on expeditions, but in view of the fact that many seasons' service is required and the risk of exposure to humidity is always present both tool box and main container were treated with successive coats of spar varnish, undercoating and enamel paint.

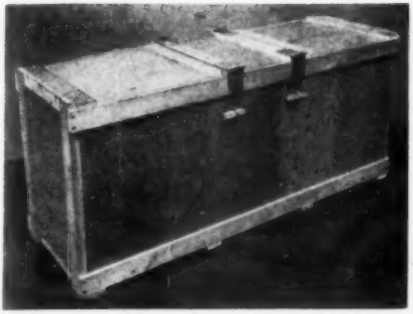

Fig. 7. Box for outboard motor. Top: closed. Bottom view with top removed, showing motor in place.

Fig. 6 shows an isometric drawing of the box evolved for this purpose, and Fig. 7 shows views of the box when it is packed with a 5 hp. outboard motor. The panels are ¼-inch plywood and all cleats ½-inch by 1⅞-inch hardwood.

The motor is attached by its normal mounting bracket to the mounting block (Fig. 6 part No. 21) and is then placed in the box so that the propeller shaft housing rests in the crotch in

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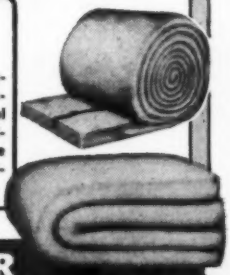

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part No. 20 and the mounting block slides down between battens No. 12 and rests on the tool box rails, No. 13. Side to side movement is prevented by the pressure block No. 14. The holding-down block is then placed on top of the mounting block and this bears against the underside of the lid where it is reinforced by one of the battens, No. 9. The lid is in three sections. The two end pieces slide into position with their ends under the end cleats (part No. 8) and the small center lid hinges into position and is held by the hasps which are bent to fit snugly under the side cleats (part No. 6). A hardwood wedge is used to fasten each hasp to its staple and wire seal (easily broken by twisting by hand) used to prevent the wedge working out in transit.

The loose parts of the box are anchored to the box by suitable lengths of safety chain.

The tool box is constructed to rest on the rails (part No. 13) and is prevented from moving by the battens, No. 12 and the stop, No. 17. The top of the tool box rests against the underside of the lid and its bottom edge rests on the lower part of the motor mounting bracket thereby helping to hold the motor securely in position.

Mounted Staves for Tight Cooperage

A new development in a different direction, currently being examined by the Laboratories, is in an endeavor to reduce the cost of tight cooperage. It would seem that the most promising fields in which to reduce costs in cooperage are those of raw material, labour costs and ease of return shipment for re-use.

The raw material in present use is very expensive as only clear lumber free from defect can be used. If a process can be found to render lower grade material usable it could have far

reaching effect in the utilization of waste material from other processes.

Labour costs are high because of the multiplicity of operations involved in conventional cooperage and the fact that selection and assembly of a set of staves is an expert operation. These costs could be materially reduced if a standard stave could be produced cheaply. Standardization is not practical at present owing to the need for maximum usage of very high grade material.

Standardization of staves would have a secondary effect in making a barrel demountable so that empties returned for re-use could be more economically transported. This would make tight cooperage more attractive to the user.

The Laboratories are now working on a method of moulding barrel staves of standardized pattern. Various raw materials of forest origin are being investigated as well as the important matter of cheap mould production. There is considerable hope of success in this investigation.

It is hoped that this description of recent work at the Ottawa Laboratory of the Forest Products Laboratories of Canada will give a picture of the kind of work being done in the container field to serve industrial needs. The work described arose mainly from requests by industry or government departments for a solution to a specific problem. For this reason, it is impracticable to give a forecast of the kind of problems that will receive attention in the near future. As in the past, the work of the Laboratory on containers will be directed as closely as possible to solving the most immediate and urgent problems in the shipment of merchandise.

The End

Many a man's train of thought carries no freight.—**Selected**

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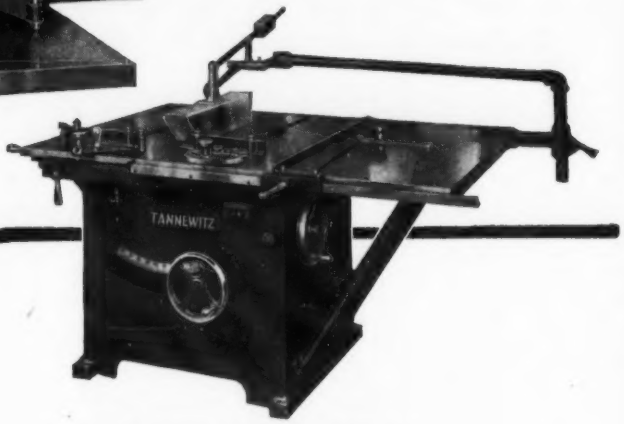
MODEL XJS. Also available without sliding table at the left (XJ).



MODEL XJSW. Same as XJS, but with extra large table at the right.

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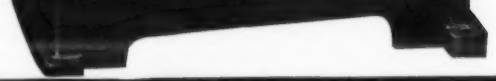

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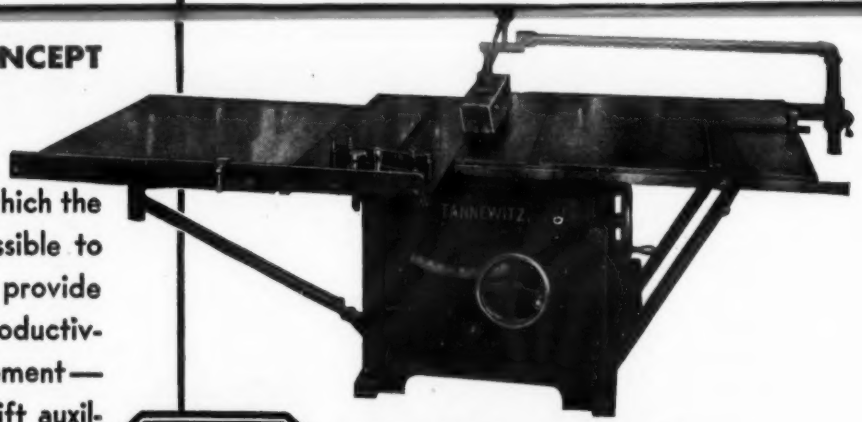

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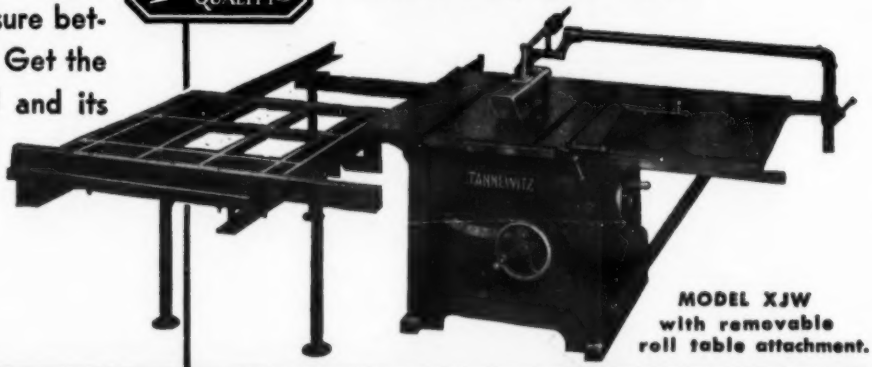

MODEL XJW with removable roll table attachment.

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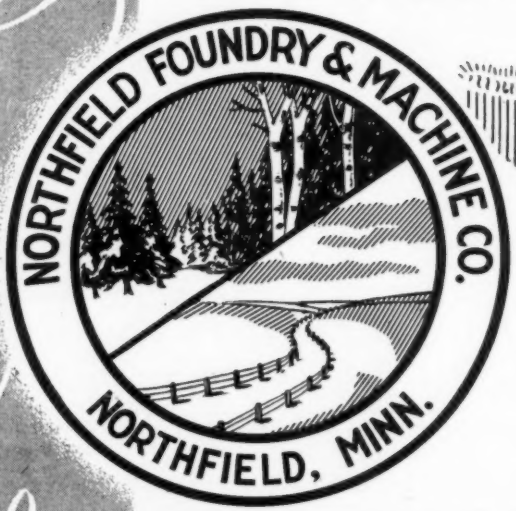

OF A FAMOUS TRADE MARK

In this, our thirtieth year, we would like to pause long enough to take a brief look back, and say thanks to all our friends and customers whose confidence and patronage has made our success possible.

To those who know us it is probably unnecessary to attempt to describe our principles of honest quality, and full value. To old customers and new, we pledge continuance of these principles which over the years have earned for Northfield woodworking equipment the reputation of sound quality, full value and long life.

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Furniture packaging versus a shortage of packaging materials

BY JACK L. WARE

THE STATISTICS most recently released from the Claim Division, Association of American Railroads, on furniture loss and damage are very encouraging. In a release made by the National Furniture Traffic Conference for five months of this year, the claims for comparable periods were as follows: 1948—$3,834,140; 1949—$2,962,800; 1950—$1,874,649.

Industry statistics on shipments by manufacturers indicate 1950 leads approximately the same as 1948; therefore real progress on this problem has been made.

As we look at the road ahead for continual progress—circumstances point to some very rough spots—it certainly behooves all concerned to know the facts, to extend our ingenuity in avoiding every pitfall that would retard our progress and actually start us on an upward trend of increased damage to furniture in transit.

The Korean situation in late June and its resultant panic-like buying surge at consumer-level in July and August brought about a terrific demand for all packaging materials. Thus manufacturers have found themselves in a position of having to change their packing methods in order to ship their goods as delivery dates on their regular packing materials were extended.

In addition to the increased demand for civilian goods, an accelerated defense program is beginning to siphon off large quantities of packing materials from the normal channels of business.

These conditions appeared almost overnight having resulted in many snap decisions, but now that they are here—it would seem to stay for a long while—every shipper of furniture must consider the effect of the situation on his own production and expected shipments.

The problem will vary between different factories for many reasons. Some of these reasons might be grouped as follows: source relations with packaging material suppliers; the amount of defense production requiring the same packaging material in the same geographical area; shortage of packaging supplies due to nationwide governmental requirements on basic raw materials which are used in the manufacture of packaging supplies—an example of this is the heavyweight, waterproof export fibreboard that requires much more pulpwood than domestic containers; the rate of domestic requirements for packaging materials.

Although the problem will vary from plant to plant, if we are to move for-

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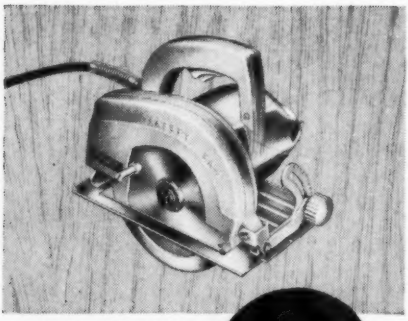

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ward against the giant economic waste of damaged goods in transit, the solution must be much the same for every shipment. Following is an approach which I am sure will be helpful in preventing this giant from bruising our industry again:

1. Make a careful analysis of your requirements so that all materials ordered will be used and not lie in stagnant inventory.
2. Study the results of your present package and, if materials being used can be reduced by re-designing the package, make the necessary changes.
3. Recheck the alternate packages which are allowed for your product by the carrier regulations, review them in the light of the materials used, their availability to you and, if more favorable, change your package.
4. Study the interior packaging where alternate materials are allowed and use the one which is most available.
5. Make a study of your container sizes and styles, possibly due to the standardization you may be using excessive packing materials, whereas in a market of scarcity it may be best to lose the standardization in order to spread the material further.
6. Review the allowable special carload packages which generally require less packing materials and determine if part of your distribution can be handled by this method.
7. Establish whether or not you can distribute more of your goods by van movement without packing, using packing blankets by increasing the trucking radius or obtaining permission to ship to additional customers closer by in this manner.

These are but a few aproaches to the problem of packing material shortages but they are sound; and I am sure that, if every furniture shipper will intelligently analyze his own situation and carefully plan his packaging based on his own requirements and availability, we can continue to show better shipping performance.

While the carrier packaging requirements have done much to improve this phase of our industry, the attention it

Just because Joe enjoys a good stogie, he shouldn't assume Mary enjoys one, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

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has drawn to the handling of furniture by the carriers, shippers and receivers alike has also contributed greatly. We dare not lose the momentum of this great improvement. We must, therefore, not make any move that will lower our standards.

The Society of Industrial Packaging and Materials Handling Engineers—of which I am a member—has for a slogan "Turn problems into profits." I am sure that, if we each study carefully our own problems, we can still ship the furniture production of this country safely and profitably.

The End

Additional information on any product mentioned in this issue is available from our Market Service.

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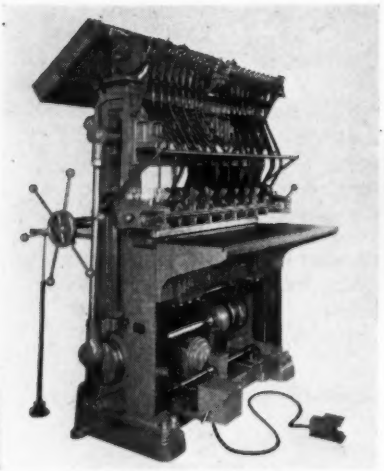

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B. Solenoid trip permits operator to trip machine at any position desired.

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1. Anti-friction bearings
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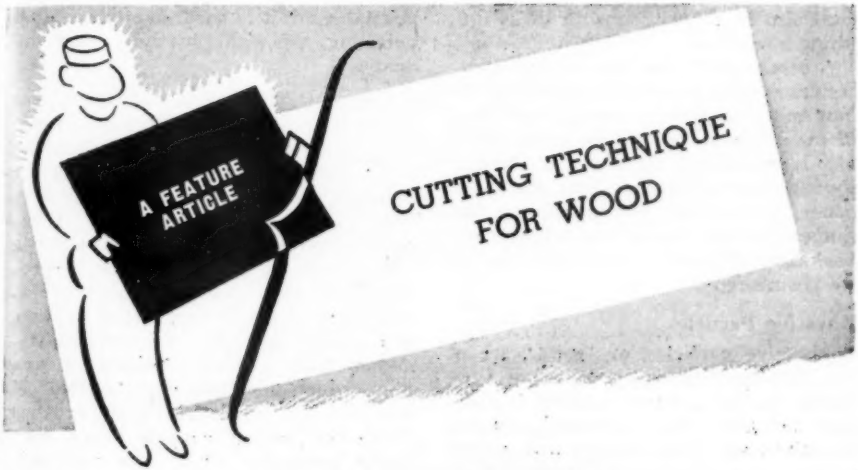


IX. ABRASIVE CUTTING

By Thomas D. Perry

The cutting tools so far described in this series, have been made of various types of steel, hardened and tempered to "hold their edge," and designed to saw boards apart, to plane wood surfaces, to mold edges and to perform other similar operations. Abrasives also are wood cutting tools, but of quite a different type, and are largely limited to the smoothing of surfaces by the removal of tool marks, grain protrusions and the like, until a smooth glassy surface results.

Abrasive materials also leave tool marks, but by the reduction of the size of the abrasive particles and proper technique, such marks may be so infinitesimally small that they are not observable, except under the magnifying glass, and the resulting surface is smooth enough for a fine piano finish.

WHILE THE general term "sandpaper" is in popular use, and probably never will be abandoned, it is incorrect since natural sand particles are too rounded and have not been used since primitive times. However, the small rough, but sharp, particles used in making what is called sandpaper, do resemble sand, and thus the term originally came into use. The correct term, which is gaining in popularity, is **coated abrasives.** These coated abrasives are used extensively, both in the wood and metal industries, as well as in many others, and the same or similar abrasive particles are assembled into wheels, discs, or stones for cutting metals, for sharpening metal tools, for cutting and polishing jewels and for performing like operations on many other materials. This discussion, however, will be limited to coated abrasives employed for smoothing wood, as an intermediate operation after machining wood to final shape and before applying the various protective coatings, varnish, lacquer, paints and other finishes. Some of the finer coated abrasives are

used also in connection with these finishing operations.

A better understanding of coated abrasives can be gained by describing the four more important features involved in making and using coated abrasives, viz.: Abrasive particles, or "grits," source, processing and size; Backings, paper, cloth and combinations; Arrangement and attachment of grits on backings; Use of coated abrasives in woodworking.

Abrasive Particles

Abrasive particles, or "grits," are of two principal types, natural and synthetic, the latter being smelted in electric furnaces. The principal natural abrasives are flint, garnet and emery while the synthetic varieties are silicon carbide and aluminum oxide.

Flint is more correctly called flint quartz, and the raw material is found in almost every state of the Union. It is the common basis of the conventional sandpaper, usually sold in sheets for hand sanding in many kinds of woodworking shops. While flint breaks up into sharp crystals, they lack the hardness and durability of the other abrasives, and their cutting life is relatively limited.

Garnet, of the types that are useful for abrasives, comes mostly from the northeastern states, and is closely related to the attactive red garnets used in jewelry, which are selected for color and clarity. Garnet crystals, when crushed, are far harder and sharper than flint, of the order of 6.5 to 7.5 Moh. In wear, garnet grits break down into smaller sharp crystals, so that they render an abrasive service distinctly superior to flint.

Emery, a natural abrasive, is essentially a mixture of about 40% iron oxide and 60% corundum—which is a natural aluminum oxide and imparts the abrasive quality to emery. Since the grain shape of emery is somewhat round, although definitely sharper than normal sand, it is used chiefly for final polishing, especially in the metals industries.

Silicon Carbide, as an abrasive, was an accidental discovery in experiments to make artificial diamonds during the early 1890's. Its original use was for polishing diamonds and other jewels. Later, as its cost was reduced, it became available as an abrasive for a wide range of applications. It is produced commercially by heating a mixture of sand which contains the silicon, and coke, supplying the carbon, together with a small amount of saw dust, which adds porosity, to 4200° F. After cooling and breaking, the crushed lumps of silicon carbide have very sharp surfaces, which are intensely hard and of the order of 9.5 to 9.9 Moh—almost as hard as natural diamonds which rate as 10 Moh. While abrasive particles of this material are very sharp and hard, they are brittle, and thus have certain limitations in abrasive work.

Aluminum Oxide was developed around the turn of the century, and is a smelted derivative of bauxite, an ore which also produces aluminum and alum. A mass of this ore, with small amounts of coke and iron filings, is heated to around 3500°F in an electric furnace, producing a large "pig" which may contain as much as 50% aluminum oxide. The aluminum oxide, as an abrasive, has characteristics quite different from silicon carbide, since the former is more chunky, while the latter breaks into rather long, thin, sharp crystals. Aluminum oxide is not quite as hard nor as sharp as silicon carbide, but it is considerably tougher and does not fracture easily under heavy cutting loads. These qualities of aluminum oxide have made it the most important abrasive for a wide range of uses.

The more important differences in the shape of these several abrasives

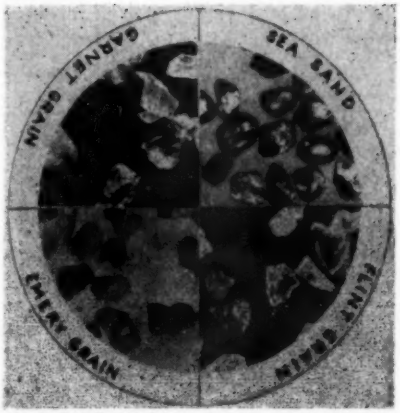


Fig. 1. Different types of natural adhesive grains (enlarged).

are contrasted in Figs. 1 and 2, although sharpness is a quality hard to photograph.

The sizes of particles for making coated abrasives are controlled by sifting through screens of a given mesh, and the fineness of this mesh is part of the trade designations in garnet and the synthetic abrasive coating materials. The finest mesh screens, of miniature silk threads, have 240 openings per inch, or 57,600 per square inch, almost unbelievable minute. Finer grains than this must be separated by sedimentation or air flotation. In the earlier abrasives, flint and emery, the trade designations were by assigned number only, i.e., from No. 3 (coarse) to No. 7/0, or 0,000,000, (very fine). The current standard grade terminology is given in Table 1, in which the designations in each horizontal line are equivalent for size. Manufacturers of coated abrasives have adopted proprietary trade names for most of these materials, but are quite willing to supply the technical description on request.

Backing Materials

Coated abrasives for woodworking are usually mounted by means of an adhesive on paper, cloth or a cloth-paper combination.

There are two principal types of paper used for backings: those made by the Fourdrinier process, laying down a single layer of pulp; and by the cylinder process, by which several layers of pulp are combined into a single thickness for added strength. The paper may be made from kraft fibres, which are wood extractives both flat and thin; or from the fibres of old rope, which are long and rope-like, with substantially greater strength than the wood fibres. These papers are made in various thicknesses to meet the limitations of economy and supply necessary strength. The Fourdrinier kraft papers make suitable backings for hand papers, while cylinder rope papers are required to meet heavy strains and severe service in large high speed machines.

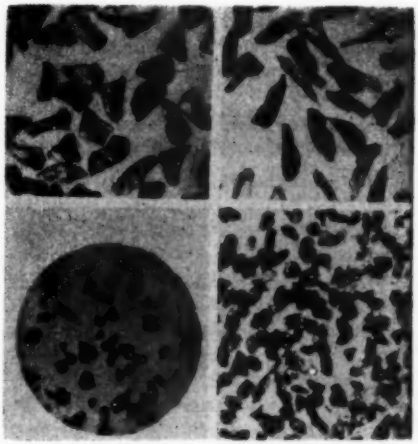


Fig. 2. Natural compared with synthetic adhesive grains (enlarged). Natural group: upper left, flint-crystals with sharp corners; upper right, garnet—corners sharper and more angling. Synthetic group: lower left, silicon carbide—thin sharp crystals, very hard and brittle; lower right, aluminum oxide — sharp corners but more chunky and tougher than silicon carbide.

Table 1. **Grade Designation Chart for Coated Abrasives**

	Silicon Carbide	Aluminum Oxide	Garnet	Flint	Emery
VERY FINE					
	600	.....	.....	.....	.....
	500	500	.....	.....	.....
	400	400-10/0	.....	.....	.....
	360	.....	.....	.....	.....
	320	320-9/0	.....	7/0	.....
	280-8/0	280-8/0	8/0-280	6/0	.....
	240-7/0	240-7/0	7/0-240	5/0	.....
	220-6/0	220-6/0	6/0-220	4/0	.....
FINE					
	.....	.....	.....	3/0	.....
	180-5/0	180-5/0	5/0-180	.....	3/0
	150-4/0	150-4/0	4/0-150	.....	2/0
	.....	.....	.....	2/0	.....
	120-3/0	120-3/0	3/0-120	.....	.....
	.....	.....	.....	0	0
	100-2/0	100-2/0	2/0-100	.....	.....
MEDIUM					
	.....	.....	.....	½	½
	80-0	80-0	0-80	.....	1
	.....	.....	.....	1	1½
	60-½	60-½	½-60	.....	.....
	.....	.....	.....	.....	2
	50-1	50-1	1-50	1½	.....
COARSE					
	.....	.....	.....	2	2½
	40-1½	40-1½	1½-40	.....	.....
	.....	.....	.....	2½	.....
	36-2	36-2	2-36	.....	.....
	.....	.....	.....	.....	3
	30-2½	30-2½	2½-30	3	.....
VERY COARSE					
	24-3	24-3	3-24	3½	.....
	22-3¼	.....	.....	.....	.....
	20-3½	20-3½	3½-20	.....	.....
	18-3¾	.....	.....	.....	.....
	16-4	16-4	.....	.....	.....
	14-4¼	.....	.....	.....	.....
	12-4½	12-4½	.....	.....	.....

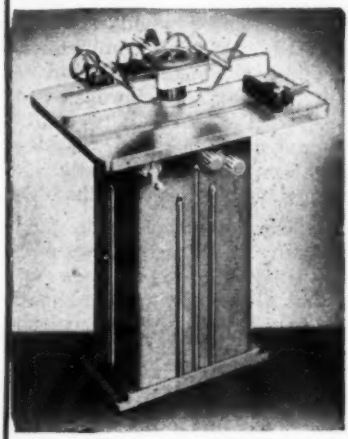
Dashes (.....) indicate that grades are not supplied.

Where abrasive operations require more flexibility or greater strength than paper backings, cotton cloth backings are used. Both jean and drill cloth are of a diamond weave, with greater strength longitudinally than cross wise. Jeans are a lighter weight material than the drills, and will not endure such heavy service. Soft jean cloth is required on moldings and other irregular surfaces.

Combination backings may be required to add the strength of the cloth to the stiffness of the heavy papers. The paper and cloth are first glued together, sometimes in strips many miles long, and it is an art to keep them straight and free from wrinkles. For extra heavy abrasive work at high speeds, as on sander discs, a heavy vulcanized fibre backing is sometimes used, which combines maximum rigidity with strength.

Arrangement and Attachment of Abrasives on Backings

There are two types of coatings, which differ in the arrangement of the abrasive particles on the backings, and are suited to various kinds of abrasive service. The closed coating provides a relatively complete and compact single layer of abrasive particles on the backing with a maximum concentration of cutting points. The open coating distributes the particles evenly, but leaves some 30% to 50% uncovered area on the backing, and results in a more flexible product with fewer cutting points.



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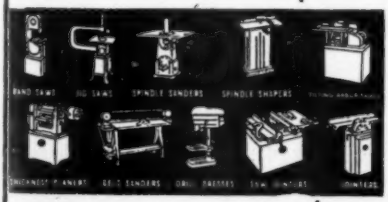

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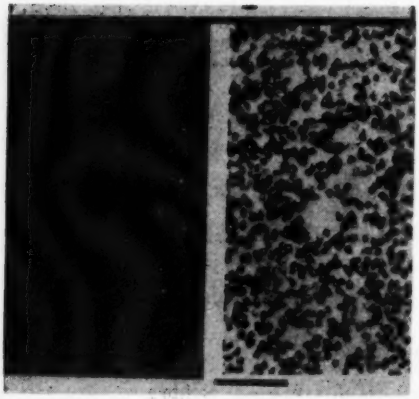

Fig. 3. Arrangement of abrasive particles on backings. Left, closed coating; right, open coating.

The contrast is shown in Fig. 3. Under heavy service conditions, the closed coatings provide greater cutting capacity, but are apt to clog up, or become "loaded" and develop friction with reduced cutting action. On the other hand the open coatings, with their greater flexibility, are better adapted to curved or irregular surfaces. The open coatings, with fewer cutting points, and space for the accumulation of cutting waste without clogging, often surpass the closed coatings in many abrasive applications.

There are two types of adhesives in general use for bedding the abrasive particles on the backings. The adhesive must be strong enough to hold the particles firmly in place during the useful life of the product, and the grip must be adequate to tear out the backing.

A special grade of hide (animal) glue was used for many years and is still widely employed when moisture is not a problem and where friction does not develop elevated temperatures over approximately 100°F.

The other major abrasive adhesive is a synthetic resin, which hardens under heat, is waterproof and is not appreciably deteriorated by high operating temperatures. These resin adhesives may be used in various combinations, including in some instances, a pulverized mineral that adds hardness and toughness to the bond between the abrasive and the backing. Resin adhesives have contributed substantially to the improvement of coated abrasives.

A far reaching development in gluing abrasive particles to the backings is the electro-coating method. It is well known that electrically charged particles tend to stand out at right angles to oppositely charged surfaces, and this is the fundamental principle involved in electro-coating. The illustrative sketch in Fig. 4 indicates how this principle is applied to coated abrasives. The abrasive particles, on entering the electrical field, near the negative electrode, are charged negatively. This attracts them toward the positive electrode, and they are planted endwise in the freshly glued surface of the backing near the positive electrode. The relative lineal speed of the conveyor belt and the backing can be regulated for the various sizes of grits and the degree of open coating that may be desired. The backing strip, with the freshly embedded abrasive particles, passes into an air conditioned drying room, where the glue is hardened, either by evaporation in the case of hide glue, or by polymerization when resin adhesives are employed. These abrasive particles are deposited on wide strips of backing, which are suspended in large loops in the drying room, and when thoroughly dry, are wound into "jumbo" rolls to be later cut and reeled to the desired sizes.

The contrast between this electro coating method and its predecessor is most marked. Formerly the abrasive particles were sifted and dropped by gravity on the freshly glued surface. They might fall endwise or sidewise,

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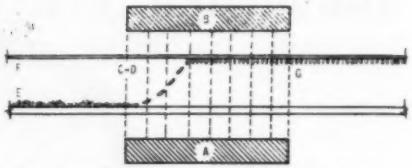

A. Negative Electrode
B. Positive Electrode
C-D. Lines of Electrical Force
E. Conveyor Belt carrying loose grain.
F. Paper: glue side down.
G. Abrasive Grain imbedded vertically in glued surface.

Fig. 4. Diagram of electro-coating method, not to scale.

without consistent pattern, and it was difficult to maintain a uniform degree of concentration on the backing.

Use of Coated Abrasives in Woodwork

Coated abrasives should always be stored in air conditioned rooms, cool, around 60°F, and dry, around 50% R. H. Whenever possible it is desirable to keep them in original packages until actually needed, as such packages afford good protection from moisture and dust.

The material removed from wood surfaces by abrasive action is mostly in the form of minute shavings, rather than in the form of dust as popularly supposed. This is illustrated in the photomicrograph of Fig. 5. The "tool

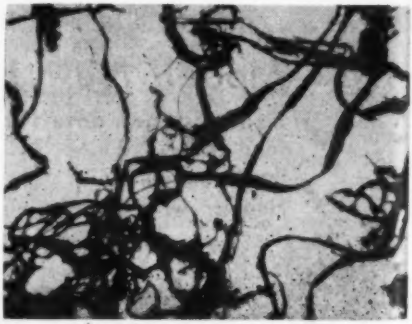

Fig. 5. Minute wood shavings, abrasively cut by aluminum oxide.

marks" or striations of the abrasive particles produced in wood surfaces are shown in Fig. 6, indicating the difference in the coarse abrasive groove made by No. 1½-40, down to the fine and almost invisible grooves resulting from the use of No. 2/0-100. Drum sanders are usually set up with progressive graduations in the size of abrasive particles, the first drum cutting with a coarse size and the last drum ending with almost a polishing grade of abrasives.

Properly adjusted sanding machines, with the right grade of abrasive, should produce uniform surface cutting. However, in species of wood, with distinctly varying texture characterized by hard and soft spots, light cuts are preferable to heavy cuts which might cut too deeply into these soft areas, and result in uneven surfaces.

Efficient speeds for sanding operations vary widely according to the type of machine in use. Most drum sanders operate in the range of 4,000 to 5,000 lineal feet per minute, while belt sanders usually average 5,000 to 6,000 feet. Some excellent belt sanding machines are operating effectively at speeds as

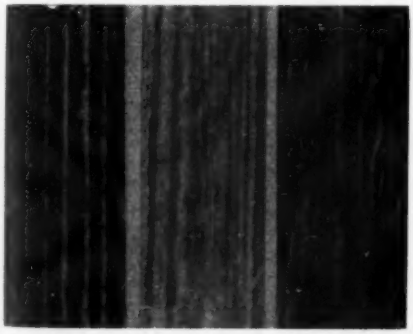

Fig. 6 Striations from different grades of aluminum oxide. Left: using grade No. 1½-40 aluminum oxide; Center: using grade No. ½-60 aluminum oxide; Right: using grade No. 2/0-100 aluminum oxide.

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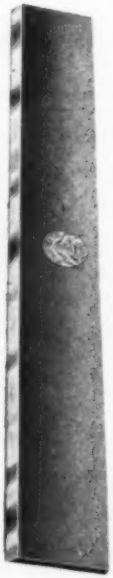

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high as 10,000 feet. As the speed increases, better backings and more durable cutting points are necessary. At the higher speeds, due to frictional heat and heavy cutting demands, only abrasive coatings with resin adhesives and of the electric furnace types, will give reasonable cutting life.

Most woodworking operations use flint, garnet and aluminum oxide abrasives, flint being the lowest in cost, with the others graduated upwards. The use of flint paper is largely limited to hand sanding, and it is widely available in retail hardware stores. Discriminating users find that garnet papers for hand sanding, have better cutting efficiency and, in the end, are more reasonable in cost. Garnet and aluminum oxide are the rule for machine sanding on wood. In general, slower machines, lighter cutting and the softer woods find that garnet is adequate, but aluminum oxide for heavier service is usually found to be the most economical. The various grades of paper backings are usually strong enough for most wood sanding machinery, except where very heavy cuts are required, such as 3/32" to ⅛". Belt sanding for moldings and curved work should have cloth backings.

Silicon carbide abrasives are seldom used in woodworking, except for unusually difficult service, such as removing hardened floor coatings, accumulated glues, plastic facings and the like. They may be found especially adapted to reconditioning old floors or heavily painted surfaces, to prepare for refinishing.

There are many variables involved in selecting the right size and type of coated abrasive for a given job. The available range, from the most severe service on the densest materials to the easy cuts on soft materials, is almost

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staggering. The problems of strength, flexibility, cutting efficiency, durability, long life and shaving clearances are all involved. One good rule is to recognize that two light cuts are usually preferable to one heavy cut, even though a bit more costly.

Conclusions

The problem of finding the answer as to the best abrasive technique for a given job is not actually as complicated as it might appear, with such an assortment of possible combinations. Experience in many woodworking shops has developed and demonstrated many satisfactory and effective procedures. Often the same end can be attained by several methods, indicating that cost and quality comparisons may be needed to give the final answer.

One recommendation is beyond dispute. The coated abrasive manufacturer has learned the advantages and limitations of his products. He is always anxious to help the user in every way possible. His representative can be of great assistance in solving problems and should be freely consulted. No one type of abrasive will meet all requirements, any more than one type of tool steel. Each problem and product requires study and tests to establish shop standards. When once established, they should be modified only as the result

This is the last of nine articles on "Cutting Technique for Wood." The complete series will be available in reprint form. Please write us if you wish reprints of the entire series or any particular article.

If readers note any important omission of cutting tools throughout the series, please write us. Both the author and publishers will appreciate hearing from you.

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of convincing tests. A willingness to experiment in new ways may be very stimulating, but it must be done intelligently and under reasonable controls.

Appreciation is due to Behr-Manning, a division of the Norton Company, for supplying illustrations and checking the text of this article.

The End

PLANT MAINTENANCE SHOW

Once again American industry heads into a wartime economy. This means that there must be an increased measure of efficiency throughout our plants. The program for the January 15-18 Plant Maintenance Show has taken this factor into consideration.

Sessions planned for this Cleveland conference include preventive maintenance, organization and management maintenance and housekeeping. These general topics are discussed in more than a dozen sectional and general sessions.

Complete information as to exhibitors, program, etc. is available from Clapp & Poliak, Inc., 341 Madison Ave., New York City.

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Perkins Glue Company is adding two men to their sales force. Virl Marshall, formerly a production engineer, has taken over the Grand Rapids territory, including most of Michigan, upper Ohio and Indiana.

Hick Williams, former plywood plant superintendent, was appointed to take over a newly created territory including Alabama, Georgia and Florida.

Fred Atkinson, former Grand Rapids representative, has moved to High Point, North Carolina for duties to be announced later in conjunction with the opening of the new High Point plant.

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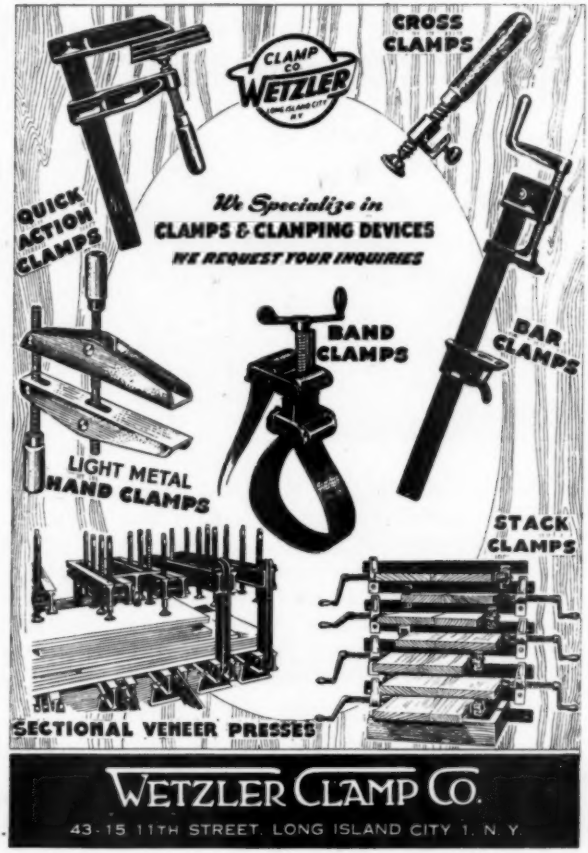

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Another quarter of a million similar labels, emphasizing the show and inviting each recipient to "Visit Our Booth" will be supplied to exhibitors for their own use. They will also be supplied electroplates of the show label for imprinting directly on their letterheads and for use as "spot" features in their trade press advertising.

"You sure must like coffee," said the waiter to the man who had his cup refilled for the seventh time.

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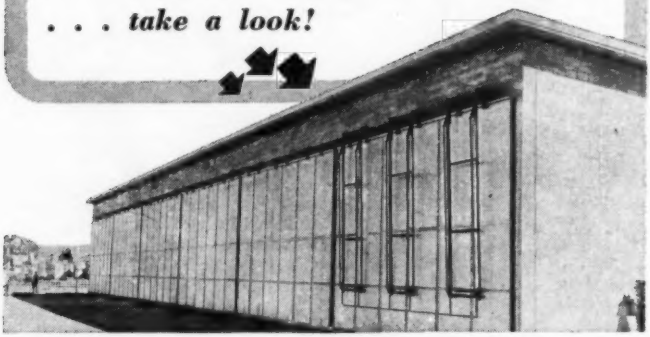

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According to Associate Director Lucius F. Foster, the Wood Heel Manufacturers' Association is the only one of its kind in the industry, but it has been supported only by New England manufacturers.

With the coming of the Defense Production Act, and all its implications, the association has found it desirable to extend its membership so that it may truly represent and speak for the industry in Washington and elsewhere.

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The Valley Forge Safe-Eye Smoke Alarm System involves use of a photo-electric cell and very sensitive amplifier, used in conjunction with a light beam projector that covers extreme areas. The units are quite small and compact. It requires only a good puff of cigarette smoke (or fire smoke) across the light to set off the alarm.

This smoke alarm system will cover distances up to 200 feet in length by 30 feet in width, with each individual unit taking care of this large space. This protection area makes the system applicable virtually anywhere.

The units are easy to install. An electric outlet box is required near the photo-electric cell, while another should be placed near the light beam projector. Two small wires are connected to the photo-electric cell and the alarm. Each unit consumes about the same amount of electric current as a 25-watt bulb. Where partitions between spaces are encountered, small holes of 3 to 6 inches in diameter are drilled, permitting the light beam to pass through. One of the Valley Forge Safe-Eye Smoke Alarm installations has wood and cement partitions every 20 feet.

For further information write to Dept. WD, Valley Forge Safe-Eye Alarm Service, Valley Forge Highway, Lansdale R. R. 1, Pa.

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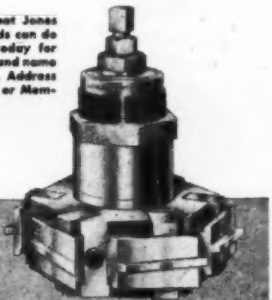
Side-by-side comparison of operating results again and again confirms the quality, durability and over-all economy of Jones & Orth cutter heads.

Find out NOW what Jones & Orth cutter heads can do for YOU! Write today for our latest catalog and name of nearest dealer. Address either our Seattle or Memphis branch!



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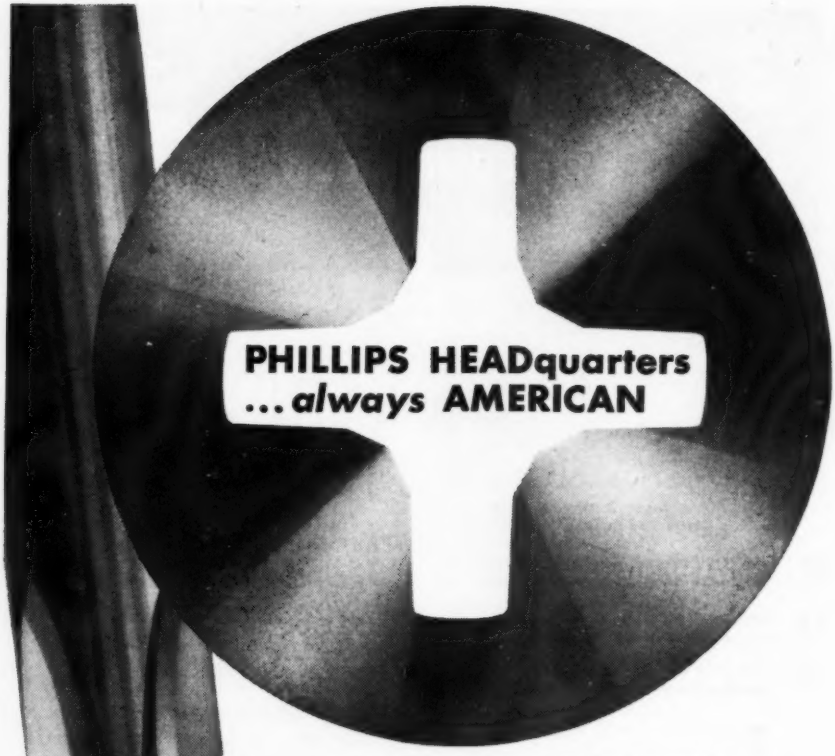

Get the profit-protection of easy-handling, straight-driving, non-skid Phillips Screws . . . the modern fastenings that cut assembly time as much as 50%.

And get, *too*, the uniform quality, top "know-how" and unmatched research facilities that are the *special* advantages of AMERICAN Phillips Screws.

What's more, it's now better business than ever to "fasten with Phillips"... because the Phillips recess is being sold (every month, through the Saturday Post) as a buyer's guide to quality in all types of Phillips-fastened products.

And whenever you *think* of Phillips Screws, remember that it pays to *say:* "AMERICAN Phillips Screws!"

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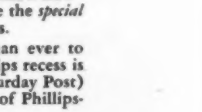
AMERICAN PHILLIPS *Screws*



ALL TYPES
ALL METALS: Steel, Brass, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

F.P.R.S. *Clinic*

WHAT CAN BE DONE TO MAINTAIN MOISTURE CONTENT IN THE FINISHING ROOM?

As a special service to our readers, this Forest Products Research Clinic will appear in each issue of WOOD WORKING DIGEST for the next several months. It will cover any subject from logging through finishing in the woodworking industry. Specialists in various fields will answer your problems. If there is some matter you would like to have discussed, please send your problem or question to WOOD WORKING DIGEST Research Clinic Editor. This month's report has been contributed by W. Linton Getz, wood consultant for the Philco Corporation, Philadelphia, Pa.

The Problem

It is known that changes in the moisture content of wood which is in process of being finished can cause developments in the finish, both during and after the finishing process, which can affect the acceptance or rejection of the product. What if anything can be done in the finishing room to maintain a stable moisture content in the wood so as to avoid trouble?

The Clinic Reports

Except where conditions are unusually moist, there are a number of practical things which will help. The most important of these are:

(A) Maintain proper temperature and relative humidity at all times during working hours. Temperature alone will not suffice as evidenced by the trouble we experience in humid spells during late spring and early fall. A large number of plants try to maintain a temperature of 70° to 75° Fahrenheit and a relative humidity of 35 to 40%. This corresponds to a moisture content of 6 to 7½%.

(B) Maintain proper temperature and relative humidity over week-ends, holidays, and during the night. Some manufacturers feel that reducing temperature in the plant during such periods is not harmful and is economical. For the work that is completely finished this may not be too serious; however, a large quantity of work in the white would be affected. Since this work cannot be moved, I would recommend that at least the temperature be kept at a minimum or 65° Fahrenheit during these periods.

(C) If glue sizing is done it should be carefully controlled and sufficient time allowed for the applied moisture to escape being temporarily trapped. Since most panels today are bonded with either water resistant or waterproof adhesives, excessive sponging will simply load the thin face veneer with moisture which later will cause trouble. Generally this sponging is done as the last thing in assembly, and where the

rate of production is very high, little drying time is allowed. (Because of this fact and the close proximity of this operation to finishing in time and often space, it seems logical that it be included with finishing. In some plants final hand sanding is under the supervision of the finishing foreman.) The fact that the face of the veneer or whiskers has stiffened sufficiently for sanding does not indicate that all of the moisture absorbed by the veneer in the sizing process has been eliminated.

(D) When using aqueous solutions for sanding and rubbing, clean off and dry all work not completely through these operations at quitting time. I know from personal experience that this precaution will help to prevent end checking of face veneer with the resultant lacquer chipping.

(E) Plants not equipped with modern conveyorized drying rooms in their finishing department wherein outside air is brought in through washers and then heated, may find a few old fashioned heat tunnels, cheaply constructed of light framing and thin plywood or metal with infra-red bulbs as a heat source, useful in removing surface moisture from the whitewood prior to staining and again before filling and sealing. These not only remove surface moisture but will give a mild lift to the drying of these materials.

In addition, best results will be obtained and many troubles avoided if the proper equilibrium moisture conditions are maintained in all parts of the plant. To do this may involve checks of kilns, drying procedure, tempering room and plant proper. It may call for a general moisture control program. Pipes on which condensation can form might be insulated; steam line joints tightened; windows opened and closed as required, auxilliary heaters installed; or plant temperatures maintained at a uniform level.

(Extracted from a paper delivered at the Spring Sectional Meeting of the Northeast Section, Forest Products Research Society, held in Syracuse, N. Y April 11/19/50.)

Answers will be presented to other forest products problems concerning equipment, methods or materials at the Annual National Meeting and International Forest Products Industry Show to be held the week of May 7th through 13th, 1951 at the Convention Hall in Philadelphia. Information about this important international event may be obtained from the 1951 Annual Meeting Committee, Forest Products Research Society, Two Columbus Circle, New York 19, N. Y.

The End

PLEASE ADD

Reader comments indicate how well our Directory Issue has been received. Will you please make an addition to your copy? The Berthelsen Engineering Company was inadvertently omitted from the classifications Presses, plywood and Presses, veneer. They are correctly listed in the alphabetical section.

FREE SCHOOL FOR FINISHERS

Another school for finishers will be conducted by the Finishine Laboratories at the New York State College of Forestry, Syracuse, N. Y., January 8-12, 1951. Classes are conducted by E. W. Hagadorn, president of the laboratories.

This five-day course in finishing is especially intended to be helpful to those interested in refinishing and repairing previously finished wood surfaces. The majority of students who attend these classes are finishers employed in repair shops of furniture stores, department stores, etc., or men who own and operate their own repair shops.

Complete information from C. Evans, general manager, Finishine Laboratories, 627 Tallman St., Syracuse 4, N. Y.

Appointments

The appointment of **Walter F. Garlow** as sales promotion manager of the Howe Scale Company, Rutland, Vt., has been announced.

Thomas B. Malarkey has been elected president of the M and M Wood Working Company. He succeeds **Herbert Malarkey** who retired last April.

The Plaskon Division of Libbey-Owens-Ford Glass Co. has moved its Greensboro, N.C., office to 490 W. Harper St., Lenoir, N.C. **Homer T. Yaryan,** who has been associated with the Company for 17 years, will handle all glue and industrial resin accounts in the states of Virginia, North and South Carolina.

Jack Root, general manager of the Anaconda Copper Mining Company's Bonner Montana sawmill, has been appointed a director of the Ponderosa Pine Woodwork Association.

The election of **Allan W. Walter** as comptroller of Pullman Incorporated has been announced by the Corporation.

James F. Hamilton is the new manager of laminating operations for M. Murphy & Son, Inc., Ellicottville, N. Y.

Williams-Brownell, Inc., Asheville, N. C. tell us that **Ray Prine** has joined their organization as vice president in charge of production.

E. C. Atkins and Company announce several appointments and promotions. At their annual stockholders meeting, all directors were re-elected. New officers elected by the directors are **O. F. Heslar,** executive vice president, and **J. G. Martin,** assistant secretary-treasurer. The Company also announces the appointment of **Howard E. Jenkins** as manager of the Company's eastern territory with headquarters in New York City.

BRADLEY BRAND

Symbol of Bradley Standards... your Unerring Guide to

TOP QUALITY!

When you're in the market for *premium value*, you'll get it in these Bradley Brand products:

Hardwood Furniture Dimension

Properly Kiln-dried Stock

Solid and Glued Cut to Size

Run to Detail

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Mixed Cars for the Building Trades

Bradley Hardwood Flooring in Unit Wood Blocks and Straight-line Strip in Oak, Beech and Pecan, finished or unfinished; Random Width Oak Plank, finished or unfinished. Oak stair treads, risers, thresholds and glued-up panels. Trade-marked Arkansas Soft Pine Satin-like Interior Trim, Mouldings, Finish and soft textured Yard Stock.

Sales representatives in all principal markets.

BRADLEY LUMBER COMPANY *of Arkansas*

WARREN, ARKANSAS

WD New Literature Section..

GLUE FOLDER

A folder describing "Cascophen," a liquid resorcinal resin, is being offered to the trade by the Borden Company's Chemical Division. It is claimed that the adhesive is the only type of cold-setting wood glue that meets the newest military specifications for waterproof, boil-proof bonds. It is especially fine for boat building, outdoor furniture and other critical wood gluing.

The folder is available on request to the Borden Company, Chemical Div., Dept. PR, 350 Madison Ave., New York City.

MOLDED PLYWOOD

A new brochure by Keller Products, Inc., is now available to anyone interested in the many adaptations possible with their molded plywoods. The booklet begins with a description of Keller veneer moldings for use in plywood paneling jobs.

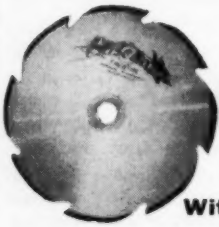
Molded parts are available for a number of wood products. These include: television lid panels, chair backs, clock cases, radio cabinets, drawer fronts, table rims, etc. A request to Dept. WD, of the above Company, Manchester, N. H., will bring you a copy of the brochure for your own examination.

GLUE POT BULLETIN

This bulletin discusses Sta-warm glue pots that feature an element which produces low heat concentration and even heat distribution, eliminating the cumbersome water bath. The units are thermostatically controlled to develop the proper temperature for glue melting.

Also discussed in the bulletin are the Triplex 3-heat pots and the 5-100 gallon glue tanks. Changes of temperature as required by various glues are also explained.

Fora copy write Dept. WD, Sta-warm Electric Co., Ravenna, Ohio.



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Manufactured to suit your individual requirements in all standard sizes.

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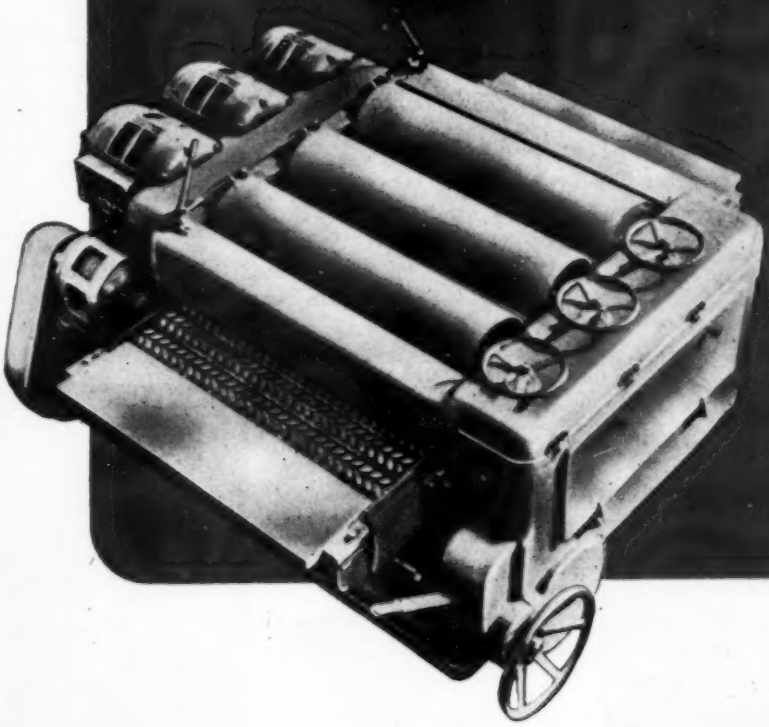
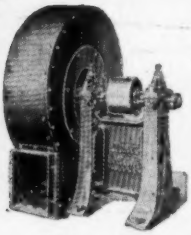
FOR THE FINEST AND THE GREATEST PRODUCTION



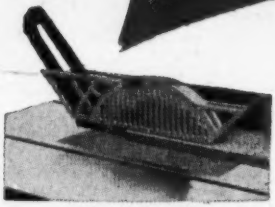
H. B. SMITH MACHINE CO.

SMITHVILLE, NEW JERSEY

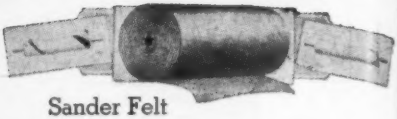
Full Lines of



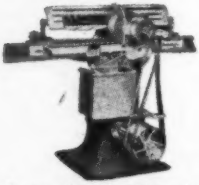
Exhaust Fans



Saw Guards



Sander Felt



Auto. Knife Grinder

Saw Mandrels

Disc Grinder

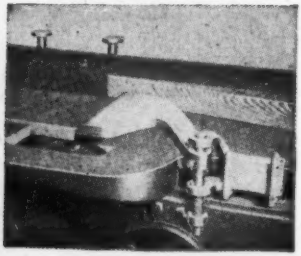
Oscillating Spindle Sander

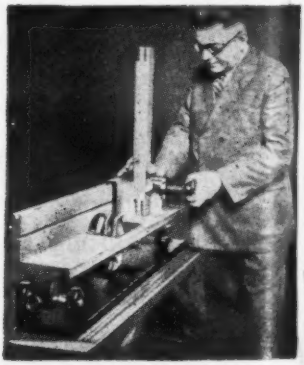
Wood Trimmer

Mitre Machines

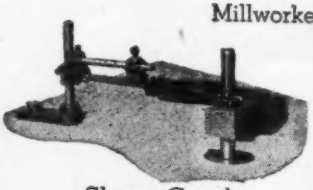
Chucking Arbor

Jointer Guards





Millworker



Shaper Guards

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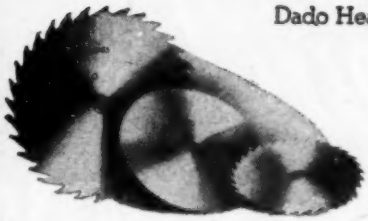
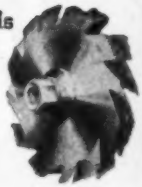
FOR YOUR WOODWORKING SHOP

ASK FOR OUR LARGE, COMPLETE CATALOG

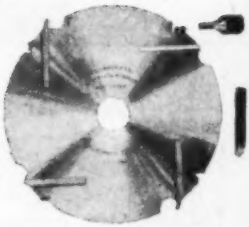


Dado Heads

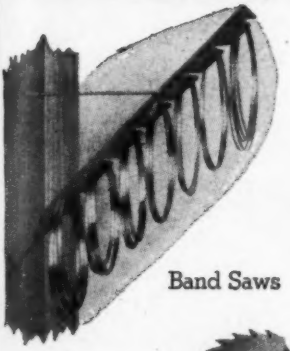


Circular Saws

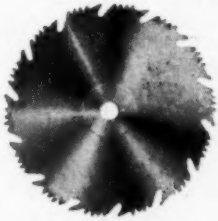
Champion Groovers



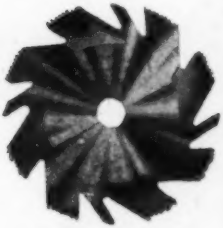
Inserted Groovers



Band Saws



Planer Saws

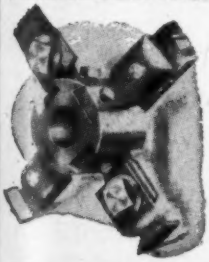


Patent Groovers

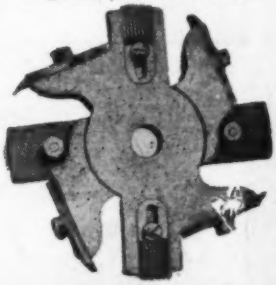
Rabbeting Saws

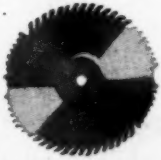
Common Groovers

Mattison Dado Heads



Expansion Dado Head





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SAFETY POWER FEED!

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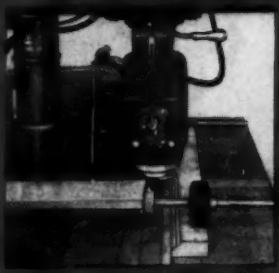

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POWER FEED RABBETING

Here's a POWER FEED that you can own and operate at surprisingly low cost!

This Power Feed can be attached to any DeWalt machine quickly, and lifted out of the way, in a matter of seconds, leaving machine free for all the 101 DeWalt operations.

The Safety Power Feed is equipped with live rollers for both the in-feed and off-feed ends of the material. It can be adjusted for speeds up to 120 ft. per minute. It holds material firmly against the fence to insure accurate cuts—is adaptable for different thicknesses of material.

Most Power Feed Rip Saws can handle lumber *only* in a straight rip position. DeWalt's Power Feed can be used also to bevel rip at any angle, plough, groove, rabbet (straight or at an angle), shape and run mouldings.

Remember, this is a complete power feed unit, including motor, switch, 3-speed drive and hinge mounting for attaching.

The price is amazingly low—only $199.00 f.o.b. Lancaster, Pa. *Just 80 cents a day over a year's period.* If you do not own roller extension tables, one pair of rollers may be secured for $12.50 additional.

Write for full information about this new Power Feed now. DeWalt Inc., 412 Fountain Ave., Lancaster, Pa. Subsidiary of American Machine & Foundry Co., New York City.

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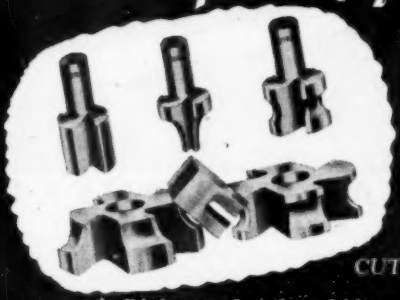
Onsrud

Carbide Tipped Cutters are ENGINEERED to Your Requirements



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- Right grade of carbide selected.
- Correct rake, clearance and shear.
- Top quality workmanship and inspection.
- Low Cost due to quantity production.

Send sketch or sample of work. Let ONSRUD'S experience work out your problems. (30 years in H.S. cutters, 12 years in Carbide)

DEALERS WRITE—HAVE SATISFIED CUSTOMERS

ONSRUD CUTTER MANUFACTURING COMPANY

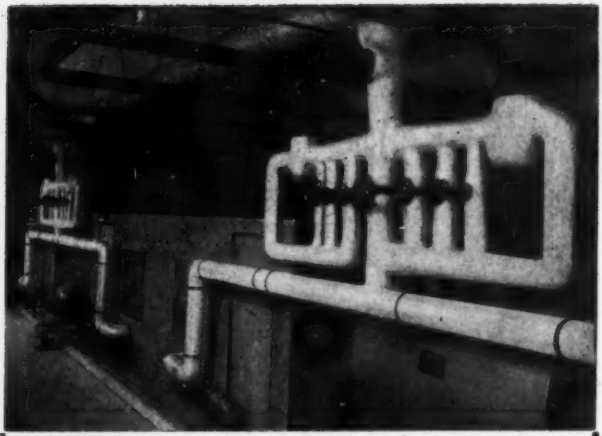
804-824 E. Broadway Libertyville, Illinois

COLD WEATHER PRECAUTIONS

As we prepare for the winter season, there are many points to be checked and especially watched in our plants. We present here the matter of "room temperature" for glues and materials.

Some urea resin glues are called "cold setting" or "room temperature setting glues." This term has led many a trusting soul astray. The truth of the matter is that all urea resin glues require heat to some extent to set properly. Room temperature in this case means 70° F. or higher. Therefore, if urea resin glues are to be used for "cold press," plywood manufacture, or for edge gluing and assembly work without the use of steam heat or high frequency heat, it is essential that much thought be given the temperatures in your plant.

Manufacturers of cold press plywood should make certain that their core-



OVERHEAD EQUIPMENT ROOM

IMRIE Sipho-Fan operating equipment is always located outside the kiln proper . . . In a light . . . clean . . . dry room either overhead or at one end of the kiln. Sipho-Fan equipment is especially adaptable to this type of kiln construction and our customers report it has many advantages, among them are

- **ECONOMY of Installation**
- **ECONOMY of Operation**
- **ECONOMY of Maintenance**

In addition, IMRIE Kilns give perfect accuracy for fine quality drying thru ElectroniK Control . . . No other kiln combines all the advantages of the IMRIE Sipho-Fan System. Write today for detailed information.

IMRIE Sipho-Fan Kiln equipment is equally efficient whether located above or below the kiln.

IMRIE DRY KILN COMPANY

PEARL & OTTAWA ST. GRAND RAPIDS 2, MICH.

stock, veneers, and glues as well as their room temperature be over 70° at all times. This means that heat cannot be turned off at night or over the week-end if there is glued up stock curing in your presses. With the coming of cooler weather in the fall of the year there is the temptation to leave the windows open because it is more comfortable to work in cooler temperatures. The veneer room foreman must be on his guard and we suggest the placing of thermometers in various parts of the gluing and curing area and that they be checked at regular intervals.

If it is impossible to maintain a decent temperature with regular heating facilities, we suggest enclosing the glue room and the installation of space heaters.

Clamp carriers can be hooded or enclosed and heated with space heaters, also. By doing this production will be increased and a good bond will be assured.

TAKE

OUT OF YOUR **Profits!**

Not only does uncontrolled dust interfere with the operation of your machinery, it materially reduces employee efficiency. With labor costs at an all time high your profits suffer. You can effectively beat the "dust problem" with a Young & Bertke Dust Collecting System. Call on us, we will be glad to give you our expert advice on either a new system or remodeling your present system to make it more efficient.

Fan and Blower Systems

The YOUNG & BERTKE Co.

1122 Buck Avenue **Cincinnati 14, Ohio**

If it is not practical to maintain heat 24 hours a day, we suggest that all gluing be done at mid-day at which time the plant should be warm and will remain so until closing time.

Beware of lumber and veneers with too low a moisture content. Lumber and veneers stored in heated warehouses will become very dry. Dry wood will act as a blotter and will absorb all the moisture in the resin glue mix before it sets resulting in a very poor bond. More rigid dry kiln control and the installation of humidifiers in heated warehouses will help solve this problem.

Remember, cold glue rooms and dry lumber are enemies of resin glue but a little forethought and preparation will give you trouble-free gluing this coming winter.

From "Bull of the Woods," issued by the National Casein Company.

There is no indigestion worse than that which comes from having to eat your own words. **—Banking**

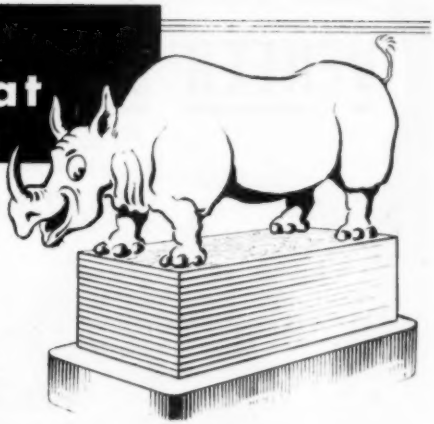
Veneer, Plywood and Laminated Wood Section.....

Features

- Veneer and Plywood
- Elastomeric Plywood
- Instrument of a Thousand Voices

How to keep PLYWOOD flat

AETNAPLY Tips Save You Money!



If you have no Rhino . . . use AETNAPLY tips!

1. **Storage of plywood panels**
   a. Lay Aetnaply panels flat on floor or in racks that are cross supported to prevent panel sagging. Keep away from radiators, steam pipes and windows.
   b. Maintain relative humidity of 40-50% around panels. Keep panels in shop long enough to adjust to temperature and humidity before cutting.
2. **Finish both sides of panel.** Seal edges. Use REZ sealer and primer.
3. **Install plywood panels** so that all four corners are secured where possible.

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You will benefit with chatterless and vibrationless operation at log speeds of over 100 R. P. M.

Large volume, high grade veneer cutting is accomplished with positive precision.

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Veneer and PLYWOOD

Part V

Veneer Cutting Equipment

By Ned Bailey

ONE OF THE many interesting "picture-stories" told by sculptures in the pyramids gives some indication of the type of tools that were used by the Egyptians to cut veneer. As you know, they decorated many interesting pieces of furniture with sycamore and ebony veneer.

From the pyramid pictures, they had three cutting tools available: the adz, the axe and a saw. The adz was good for shaping and smoothing and, by the way, is still commonly used by the Egyptian woodworker. The axe also is known to have been one of the Egyptians' early tools and was the emblem of office of the royal architect. The other woodworking implement, a 36-inch saw worked by both hands, was evidently much used. Just which one of these three was used to cut veneer, or if all of them were, still remains a mystery.

There are several methods of cutting veneer—the selection is regulated by the kind of veneer desired. The expensive, wasteful methods used a few decades ago have gradually been replaced. Today a large percentage of veneers are rotary cut. In this method of cutting a bolt of wood of predetermined length is held by two chucks and centered on a lathe. When in place, the bolt is turned against a stationary knife extending across its length. The bolt turning counter clockwise strikes the knife while a pressure bar holds firmly against the cutting edge at the instant of cutting. The knife carriage automatically advances the knife into the revolving bolt at a given speed—in this manner controlling the thickness of the sheet. The veneer thus cut passes out through a slot in the knife carriage. These modern rotary cutters are, in effect, lathes that are well bedded to withstand any shock or vibration which might interfere with the smooth action of the log on the cutting knife. Logs all the way up from 2—16 feet are cut on rotary lathes, the common length being 2—8 feet.

Logs for rotary cutting should be

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straight and sound and, for economy's sake, large in diameter. Unless the lathe is specially designed for the purpose to cut long logs, 8 feet or less is the preferred length. Better sheet surfaces are obtained from woods of moderate density if the bolts are steamed or steeped in hot water for several hours before peeling. There are, however, several woods such as basswood, yellow poplar, Douglas fir, spruce and cottonwood that produce better veneer if they are cut without soaking or steaming—"cold-cutting" it is called. These woods will produce fuzzy, fibrous veneer surfaces, in many cases, if the wood of these species are subject to preparatory heating.

In every log a core remains after the rest of the log has been converted into veneer. These cores vary in diameter according to the original diameter and clearness of the log. Many of these cores are cut into shorter pieces and placed on small lathes which cut them into veneer for fruit and berry baskets and similar forms of packaging.

Rotary veneers are manufactured in thicknesses ranging from 1/64 to ¼ inch. As the veneer leaves the log when it is cut, it bends sharply away from the bolt and as a result of this bending many small longitudinal cracks and checks often develop on the underside of the sheet. The thicker veneers—⅛ inch and up—if unrestrained, have a tendency to develop and peripheral curvature of that part of the bolt from which they are cut, and when forcibly flattened, the upperside is subject to compression stresses while the lower side is under tension. The knife checks show up particularly at the edges. The surface having the checks is the "loose side," and the other the "tight side." These are "one face" veneers. With this type of veneer the loose side is always on the glue line if the veneer is used for facing a plywood panel.

Thin veneers can be cut without

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Straight, Sharp Glue Joints • cross or with grain

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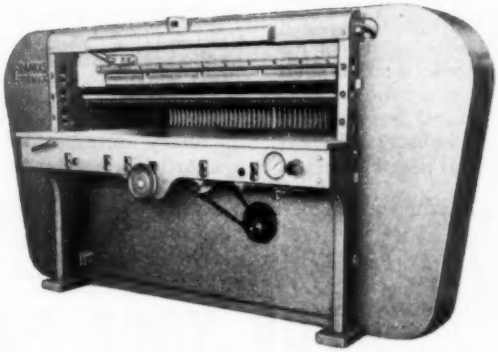

The New Francis Hydraulic Precision Cutter incorporates many features discovered under practical, production procedures in the plants of America's leading veneer and furniture manufactures.

Designed, developed and engineered for durability, the Francis Cutter has been tested and proved on America's production lines. It is sturdily and rigidly constructed, accurate to 1/64 cuts. It delivers sharp, straight glue joints on veneers up to 90 inches in width and in bundles 7" thick.

Its "easy-to-read" scale is illuminated by a flood light on the front cover. With three 20" long scales on the front section of the cutter table, a magnified depth scale of 1" wide by the depth of the machine, is graduated in 1/16", plus a master scale for positioning back feed bar, assures easy and accurate measurement for precision cutting.

The hold down bar is hydraulic pressure operated and is adjustable from a maximum of 7" to a minimum of ¾" wide clamping area. The back feed bar is electrically driven, but can be manually operated for fractional cuts.

Write or phone today for complete details and specifications.

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checking, they are called "tight-cut." This happens when excessive pressure is exerted by the pressure bar. When the pressure bar is relaxed the fibres in the wood are easily ruptured, producing "loose-cut" veneer. Loose-cut veneers do not bow so easily as tight-cut veneer. The tight side of the veneer is marked with pencil or crayon as it is cut. Thus identification is possible throughout production. The mark can easily be sanded out or trimmed off later in finishing the panel.

Immediately after the veneer is rotary cut from the log, it passes over a series of table rolls which convey it to a clipper. The operator at the clipper cuts out major defects and also cuts it into standard widths. In many plants the veneer is wound onto a metal shaft or reel. This reel has a wood facing inserted in a heavy metal frame and is placed in front of the lathe. It is driven by a special differential speed mechanism which allows the winding to be uniform as the veneer leaves the lathe. When full, the reel is removed to a reel storage space right in back of the clipper. Slow down at the lathe, because of clipper hold-ups, are reduced to a minimum where reeling is practiced. Better inspection and clipping can be achieved when the clipping is done independently. In some plants, conveyor tables 200 feet long receive the veneer as it comes from the lathe. These tables are built five or six, one above the other. A gate serving all tables is placed a short distance from the lathe and leads the veneer to the desired table. A buzzer control is used to inform the operator when to change from a full table to a vacant one. This method prevents damage and speeds up production .

Stay-log cutting is a modified form of rotary cutting and was developed primarily for producing thin, fancy face

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Standard Operating Procedure at Bacon-McMillan builds a plus into gum and bay poplar veneers that assures a constant high standard of quality. From selection of logs to shipping platform there's a rigid check-list allowing no compromise. It has to be the best to earn an okay.

Two Mills Guarantee Uninterrupted Production. Bacon-McMillan also operates the Danner Veneer Mill in Mobile, Ala. This dual operation means you will never be disappointed on delivery dates when you order from Bacon McMillan.

- **Constant High Standard of Quality**
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QUALITY VENEERS SINCE 1910 STOCKTON, ALABAMA

veneers from half or quarter flitches and irregularly shaped materials such as burls, crotches and stumps. A stay-log device consists of a long, flanged steel casting mounted in eccentric chucks of a conventional lathe. A flitch or section from a stump, crotch or burl is securely fastened to the flange with several heavy lag screws. Then to produce the veneer they are turned against the knife. Half or quarter round flitches are cut on the stay-log setup either with the outside diameter of the log or back cut when mounted so the inner or heart of the flitch is exposed to the cutting knife. Back cut veneers are also obtained from stump wood and crotches. Such veneer is usually beautifully figured. When cut across the fibre rather than along the grain, the veneer produced is very brittle and great care must be used in handling. Wider veneers are obtained by this type cutting than can be obtained by cutting on a veneer slicer.

Other veneer cutting equipment will be described in the next issue.

TESTS MADE OF PLYWOOD SHEATHING

Results of tests of the racking strength of Douglas fir plywood when used as sheathing in walls are given in an article published in Technical Bulletin No. 13 of the Housing and Home Finance Agency. These tests were sponsored by the HHFA to provide information needed in regard to the use of lower grade plywood veneers as sheathing for low-cost dwelling construction.

Plywood found unsuitable as veneers for panels and other decorative uses on account of knotholes and small defects, can be used for sheathing, thus permitting an economical use of veneers that otherwise would be wasted.

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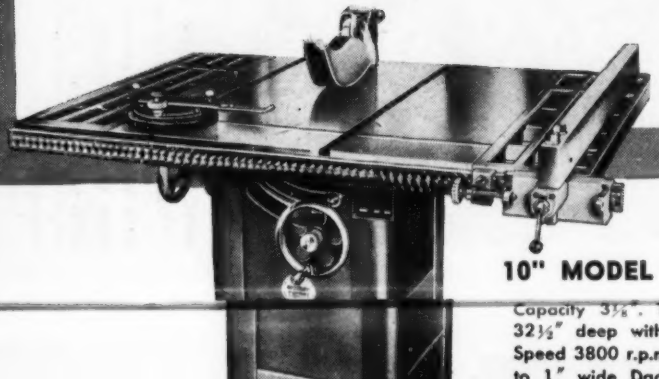
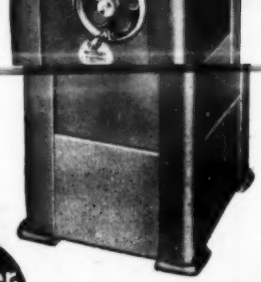
Capacity 3⅛". Table 23" deep x 19" wide. Speed 4000 r.p.m. Saw guard with splitter and 2 anti-kick back pawls. Cast aluminum rip fence is easy to adjust and assures accurate work without necessity of a test cut. Graduated support bar, adjustable pointer and micro-adjustment simplify setting up.



10" MODEL

Capacity 3⅛". Table 26¼" wide x 32½" deep with front expansion. Speed 3800 r.p.m. Saw arbor takes up to 1" wide Dado. Triple "V" Belt

Whatever the size of your operation, you can have the cost-cutting advantages of Walker-Turner machine



10" MODEL

Capacity 3⅛". Table 26¾" wide x 32½" deep with front expansion. Speed 3800 r.p.m. Saw arbor takes up to 1" wide Dado. Triple "V" Belt. Safety guard can be removed quickly by hand screw. Rip fence locks front and rear. Spring loaded support bracket keeps fence aligned with blade while setting up.

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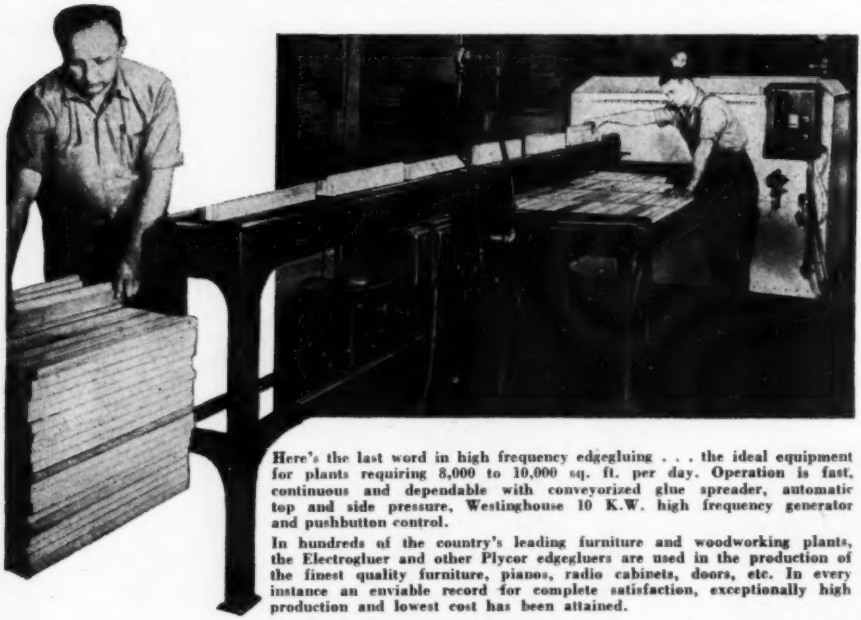

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The Plycor line includes Hydraulic Hot Plate Presses from 1 to 20 openings; Electronic Assembly Presses; Hydraulic Cold Presses; Hydraulic Precision Veneer Jointer-Cutters; Glue Spreaders; Glue Mixers; Retaining Clamps; Panel Sizers; Traveling Head Veneer Jointers; and Tapeless Veneer Splicers.

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Elastomeric plywood

by T. Dickinson

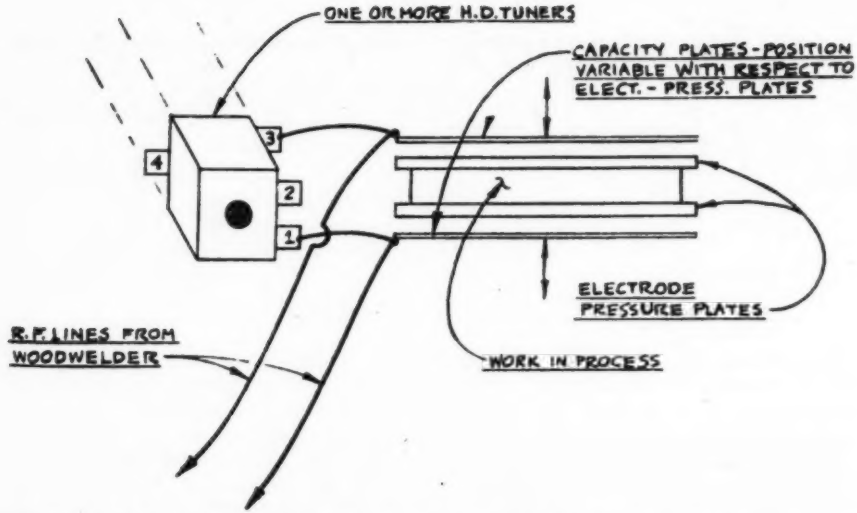
"ELASTOMERIC PLYWOOD" is now being developed by western aircraft manufacturers to facilitate the production of articles or parts with extreme shock resistance and flexibility—particularly where minimized wall thicknesses are essential. It comprises wood veneers molded over flexible core materials, or adhered with flexible-resin bonding agents; and its resilience is in many circumstances comparable to that of cardboard, although its physical qualifications in other respects could not be attained in paper products.

Both thermosetting and thermoplastic materials have been used as adhesives or core-bonding materials for elastomeric plywood. Principal fabrication methods at this writing can be briefly summarized as follows:

(1) Veneers are impregnated or coated with natural or synthetic thermosets (including natural latex, buna-n, buna-s, butyl, neoprene, thiokol and related resinous adhesive compositions), stacked, and molded as flat or contoured panels by using heat and pressure in a conventional manner to vulcanize or polymerize the flexible adhesive constituents.

(2) Veneers are impregnated or coated with thermoplastic solutions (including plasticized vinyls in the molten state, emulsions such as polyvinyl alcohol and water and dispersions such as solvent-dispersed cellulosic resins), so that the laminae can be cold-set or heat-fused with relatively small increments of pressure in a more or less conventional manner.

Vacuum bags, comprising cellophane and other materials are sometimes used as indicated here to cover elastomeric plywood laminae (stacked on or in inexpensive wood or plaster molds). Air is evacuated from the bags so that a vacuum will maintain contact between the laminate layers as the latter are heat-bonded at temperatures up to about 200° F.



Schematic details of a dielectric heating setup which has been used in the manufacture of elastomeric plywood.

(3) Facing veneers are stacked above and below thermoplastic-sheet or prepolymeric-thermoset sheet core materials, so that heat and pressure may be used to fuse or cure the cores for strong bonds with the veneer faces (which may or may not have been resin impregnated prior to lamination).

All of these techniques are adaptable to a number of unprecedented molding operations, since the flexibility of the bonded laminae will permit the removal of articles or parts from single-unit molds with backdrafts or undercuts; and, generally speaking, the function of a flexible-plastic core or bonding agent is to strengthen and maintain the natural resilience of natural wood veneers.

Infra-red, radio-frequency, steam, and oven-curing equipment are adaptable to the polymerization or fusion of elastomeric adhesives or cores. Molding pressures normally average 25 p.s.i. or less.

Elastomeric plywood is regarded as a particularly desirable substitute for standard wood laminates where thicknesses of less than ¼" are desired because it lacks the brittleness that normally tends to produce ruptures when extremely thin grades of plywood are subjected to relatively slight mechanical forces or comparatively mild weather conditions. For example, tests made at Lockheed Aircraft Corporation show that flat elastomeric plywood panels with 1/16" thickness can be manually bent to produce tubes or ducts and will retain these shapes (through the use of metal bands) for a period of more than a year without signs of deterioration.

Further, according to engineers for Consolidated Vultee Aircraft Corporation at San Diego, flat elastomeric plywood panels may be used as "prefabs" for secondary molding into products with fairly intricate contours. This is if the panels are made with thermoplastic adhesives or cores—since the latter can be readily softened or resoftened with heat and pressure

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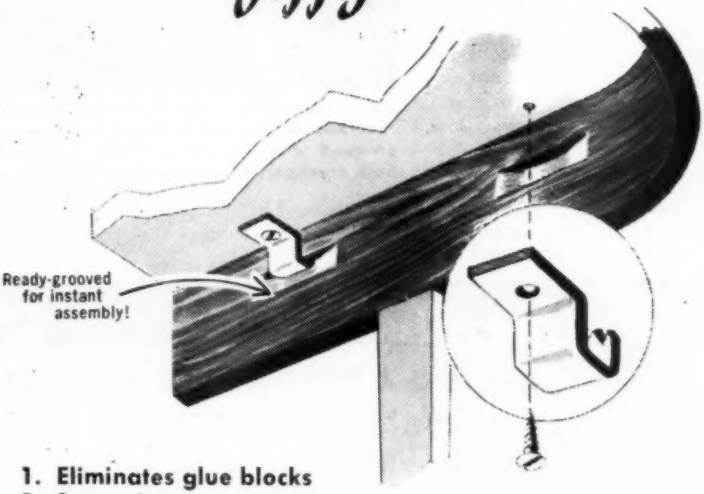

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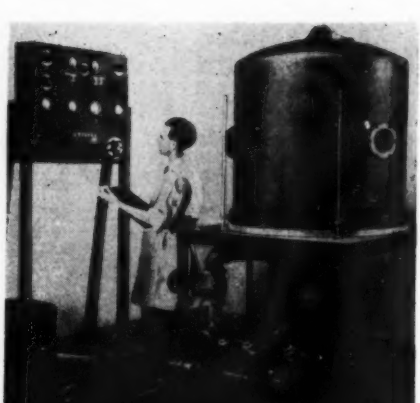
whenever necessary.

At Boeing Aircraft Company of Seattle, elastomeric plywood parts of extreme thinness and maximum strength have been made by using veneer facing materials on cores comprising Fiberglas mats impregnated with elastomeric polyester resins. Fiberglas is a product of Owens-Corning. Fiberglas Corporation at Toledo, Ohio, and polyester resins are thermosets compounded for varying degrees of flexibility and rigidity by a number of manufacturers—such as Shell Chemical Corp., New York City; Interchemical Corp., New York City; Marco Chemicals, Inc., Sewaren, N. J.; Rohm & Haas, Philadelphia; Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo; and Selectron Div., Pittsburgh Plate Glass Co., Pittsburgh.

The Boeing laminates were made by stacking core and facing materials on plaster molds or forms. The forms are then placed in cellophane bags, whence air was evacuated so that curing could



An evaporation coating unit of the type that has been used to finish elastomeric plywood with flexible metallic layers of both transparent and opaque thicknesses.

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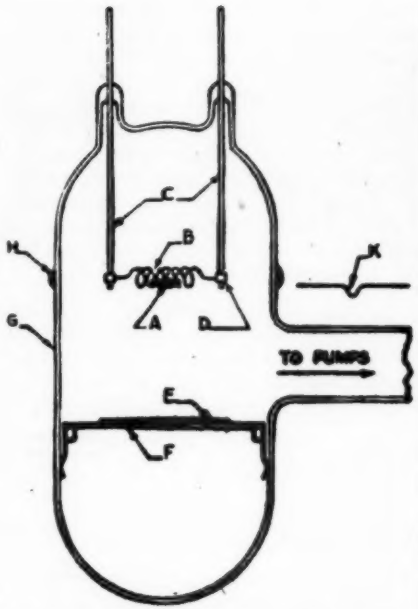


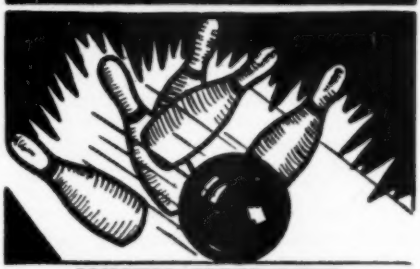
Schematic details of an evaporation coating unit: A, coating material; B, heating coil or crucible; C, electric power lines; D, supports for heating coil; E, surface to be metallized; F, supporting fixture; G, vacuum chamber wall; H, air-tight seal at point where vacuum chamber is opened and closed. Letter "K" denotes an alternate type of heating crucible for the unit.

be done without special pressure equipment by oven-heating the resin laminae materials at temperatures up to about 200° F.

In the North American Aviation plant at Los Angeles, relatively-thick grades of elastomeric plywood have been experimentally used as shock absorbers. For example, in the fabrication of airplane floor and wall panels which (in addition to absorbing hard blows and vibrations) are excellent thermal insulators.

Elastomeric plywood cannot be metallized in a conventional manner,

No Splits



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THE NELSON COMPANY
IRON MOUNTAIN - MICHIGAN

due to the rigidity and brittleness of most metallic coating materials. However, F. J. Stokes Machine Company of Philadelphia has recently developed "vacuum metallizing" equipment which is capable of applying flexible coatings of pure metallic materials where it is necessary to increase the surface hardness, reflectivity, or conductivity of plywood elastomers.

Vacuum metallizing—or, more precisely, evaporation coating—is a method of heat-vaporizing metallic materials. It is much the same as water is heated to produce steam, so that metal coatings with thicknessess ranging upward from about a millionth of an inch can be deposited on virtually all types of metallic and non-metallic surfaces. Little or no heat is conveyed to the deposition surfaces because vaporized particles have molecular dimensions and are subject to rapid cooling. If the evaporated metal coatings are applied for thicknesses of less than ten-millionths of an inch, metallized wood surfaces may look as if they had been coated with clear lacquer or shellac because extremely thin metallic coatings may be transparent as well as flexible.

Alternating current from factory power lines, transformed for output values of 1 to 135 volts and 5 to 400 amperes, has been used to heat tungsten coils or crucibles containing metals for evaporation-coating purposes. Coating operations are accomplished in vacuum chambers, so that air can be evacuated and inert gases (such as argon and helium) can be used to prevent the oxidization of coating materials. Intra-chamber gas pressures during coating operations normally range from 1 x 10-4 to 5 x 10-5 mm. hg., and "radiation baffles" are normally used to focus or concentrate vaporized metal particles for deposition purposes.

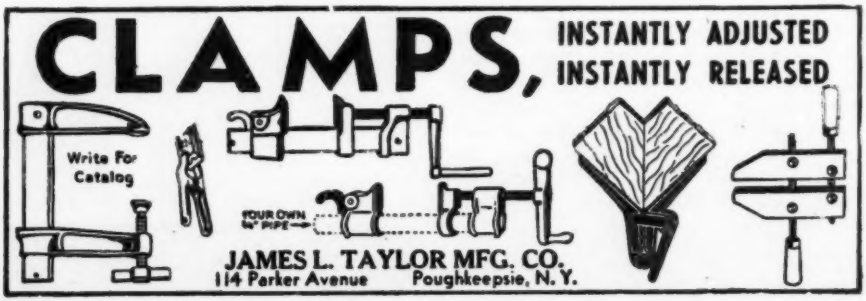
Articles to be metallized are normally mounted on fixtures over the heating element in an evaporation chamber, and typical coating materials are vaporized at presures of 10-2 Hg. as follows:

Material	Absolute Temperature
Cadmium	541
Zinc	623
Magnesium	712
Barium	905
Chromium	1190
Aluminum	1461
Copper	1542
Iron	1694
Nickel	1717
Molybdenum	2755

In addition to the above, many alloys and certain non-metals have been used as evaporation-coating materials. In any event, the depth of an evaporation coating is directly proportional to the number of minutes and seconds during which evaporation takes place.

Generally speaking, corrosion resistant materials such as aluminum are preferred for evaporation coatings.

The End



THE GREATEST CHAMPS REPEAT!

★ REMEMBER *Frank Gotch?*

Frank Gotch ranks as the greatest catch-as-catch-can wrestler of all time. During his remarkable reign as champion from 1905 until his retirement in 1913, he once lost his title by accident. In that match he was pitched against a ring post and rendered practically unconscious, and in that condition was pinned. In a return match he easily pinned his opponent and was never defeated thereafter.

★ REMEMBER *Standard!*

Since 1887 Standard Dry Kilns have helped establish new high profit records in every conceivable kind of woodworking plant. Yes, and Standard is also setting another kind of record . . . a record number of repeat orders from men who have learned from profitable experience that they can depend on Standard's scientifically engineered kilns for the most efficient and economical performance. Remember this when it's time for you to install a new kiln or remodel an old one. And remember, too, that Standard's "CHAMP" internal fan construction and perfect automatic control of heat, humidity and ventilation is *your* assurance of uniform quality at lower operating cost.

A FEW OF STANDARD'S HUNDREDS OF REPEAT CUSTOMERS:

W. F. Whitney Company, South Ashburnham, Massachusetts; Crompton & Knowles Loom Works, Worcester, Massachusetts; Knabb Barrel Company, Marcus Hook, Pennsylvania; and Vulcan Corporation, Antigo, Wis.

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Write for illustrated Standard Catalog

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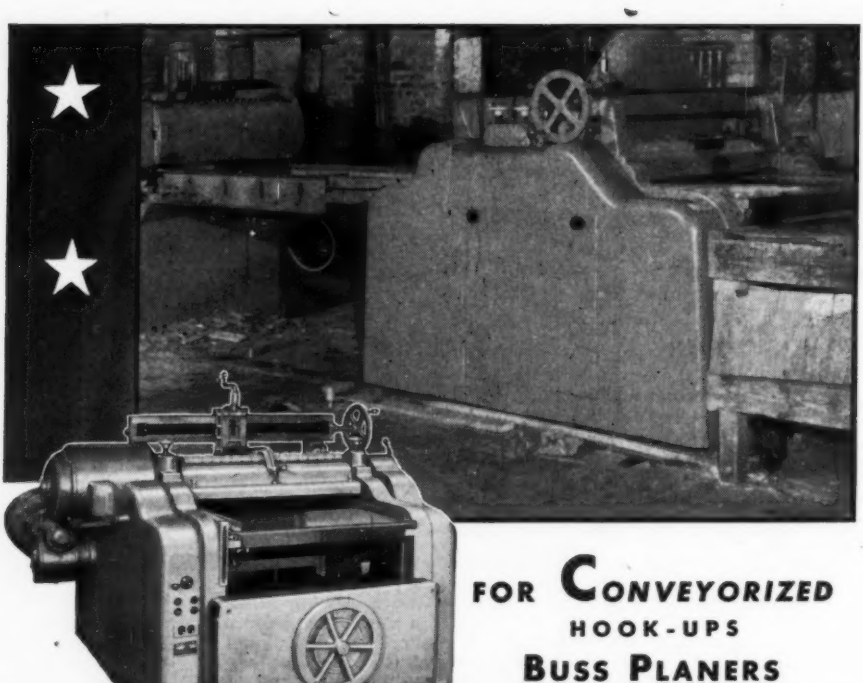

BUSS NO. 44
4 ROLL
Single Surface Planer
Capacities: 8" x 30", 36" and 40". Feeds up to 105'

FOR CONVEYORIZED HOOK-UPS BUSS PLANERS are DECIDEDLY SUPERIOR!

The BUSS line contains the ideal planer for every production set-up—single surface planers in various capacities, a cabinet double surface planer and the No. 55 double roughing planer Bulletins on request.

If you are planning a rough-planing mill hook-up, consider the many reasons why it will pay you to use either a BUSS No. 44 or No. 66 Single Surfacer: First, the distance between the frames of these planers is 5 inches greater than the length of the cutterhead, which means that in either 30 inch or 36 inch capacities, they will match up perfectly with Facer Feeders of similar capacity. You don't have to pay for the larger capacity which in other planers is required to accommodate the conveyor belt. Second, the infeed rolls that receive the lumber are made of drop forged steel, 1" wide and unbreakable. Third, the side plates are so constructed that the placing of the conveyor is convenient and simplified. Fourth, the BUSS Nos. 44 and 66 are equipped with safety features that prevent damage to the planers in event of lumber jams or sudden blocking of the feeding mechanism. And in addition there are many other structural and operating superiorities resulting from our specialization in the manufacture of planers exclusively. Write for the complete facts. We will be glad to consult with you on your requirements.

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PLANER SPECIALISTS

234 EIGHTH ST. HOLLAND, MICHIGAN

Instrument
OF A THOUSAND VOICES

THE ELECTRIC GUITAR, currently a popular instrument with bands and orchestras, was originally little more than a conventional guitar equipped with microphone, amplifier and speaker. Today, it is much different. Specifically designed for electronic amplification, the modern electric guitar has a great range of tonal qualities, and is sometimes described as "the instrument of a thousand voices."

In shape and general appearance, the electric guitar closely resembles its less versatile brother. The neck and keyboard are the same and there is little apparent difference in the top and back, except for the presence of the magnetic pickups near the bridge. But in actual construction the two types of guitars are not alike. The conventional instrument depends on the sounding boards—the top and back of the guitar—for its tone quality. The tone of the electric instrument may also be affected by the wood, but only to a limited extent; the dominant factor is the electronic system. For this reason the construction of the electric guitar may be quite different from that of the conventional model.

Every instrument manufactured at Gibson's is carefully inspected. The Tego-bonded electric guitars are strung and played through the amplifier equipment in the final test.

Gibson Guitars

This is well illustrated in the manufacturing operations of Gibson, Inc., of Kalamazoo, Michigan. For over fifty years Gibson has been making guitars (and other fret instruments, such as banjos, mandolins and ukuleles) for professional and amateur musicians. With the coming of electronic amplification, Gibson extended its line to include electrics.

The electrics, it was found, called for a change of design. The tops and backs of Gibson acoustical guitars are carved from solid blocks of wood. Spruce is usually used for the top and curly maple for the back, and it takes a wood block one and a half inches thick to make each part. It is an expensive and time-consuming operation, but the "voice" of the guitar depends on the

Tego film—phenolic resin adhesive—is being interleaved with sheets of veneer.

resonance characteristics of the particular pair of sounding boards, and Gibson takes no short cuts.

On the electric guitar, however, these costly tops and backs are neither necessary nor desirable. Uniformity is more important than resonance. Proper adjustment of the electronic system is simplified if the guitars themselves, one after another as they come from the production line, are as nearly uniform as possible.

Gibson secures this desired uniformity by using laminated tops and backs on the electrics in place of solid wood. The laminated parts can be accurately formed on presses, and they do not warp, crack or check. They are inherently strong and hence require no inside bracing. Three-ply veneer panels are employed on some models; five-ply on others. The finest professional electrics are made with curly maple or spruce veneers over basswood cores.

Bonding and forming is a single operation. Solid steel dies, machined to

We Specialize in

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OAK
MAHOGANY
PRIMA VERA

VENEERS

AND
LUMBER

AMOS - THOMPSON Corp.
EDINBURG . . . INDIANA

No foolin' with fuel...

....AT STATESVILLE, N. C., PLYWOOD & VENEER CO.

KIRK AND BLUM SYSTEMS DELIVER WOODWASTE TO STORAGE OR DIRECT TO BOILERS

AT THIS PLANT two Kirk and Blum dust collecting systems of the streamlined fitting type deposit the collected wood fuel in the bin through the two collectors shown. A third system conveys the wood fuel to the bin through either collector for uniform distribution in the bin.

Two mechanical conveyors in the bottom of the bin automatically feed the collected wood fuel to either or both of two pneumatic conveyors to the boilers. High boiler efficiency and automatic maintenance of pre - determined boiler pressure is accomplished through this pneumatic system of "suspension burning."

Getting the most out of wood waste automatically, these Kirk and Blum systems in Statesville, N. C. illustrate the experience and skill of Kirk & Blum Engineers in the woodworking industry. Whether you need a new dust control system, or feel the need of modernizing an old system, call on Kirk & Blum for a practical, "pay-for-itself" solution to your problems. Write for catalog W, "Blower Systems for Woodworking Plants."

THE KIRK & BLUM MANUFACTURING CO., 2820 SPRING GROVE AVE., CINCINNATI 25, OHIO

the contour of the required compound arch, are mounted in a 400-ton hot plate press. The outside veneers (they are only one-twenty-eighth of an inch thick) are laid up on each side of the one-eighth-inch basswood core, interleaved with the bonding agent. The assembly is then put in the press where, in less than three minutes, the parts are permanently bonded in the contour required for the instrument.

The bonding agent is Rohm & Haas Tego, a phenolic resin adhesive which is supplied in the form of sheets of film. Under the heat and pressure of the hot plate press, the resin first flows, then quickly cures, joining the veneers and the core together into a unit that is waterproof, strong and accurately shaped. Because of the uniformity of the sheet adhesive, there is no danger of poor bonding from glue-starved joints. Finishing difficulties which might arise if excess liquid glue were to soak through the thin veneers are also avoided.

High speed routers cut the "f" sound holes in the tops of the guitars.

After the formed panels are removed from the press they are allowed to

IT'S TIME TO CUT GLUING AND PLYWOOD COSTS!

With a VB HOT PRESS

THE WALL STREET JOU

What's New

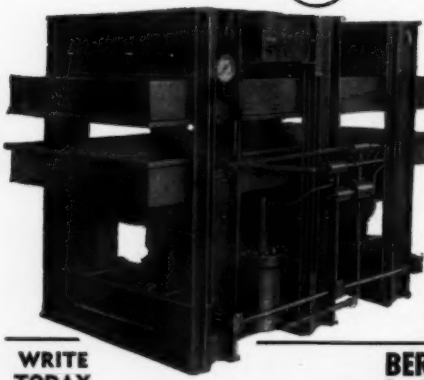
Plywood Boom

Mills Are Deluged With Orders; Some Prices Up 35% From 1949 Low

Big Demand From Builders, Furniture and Trailer Firms and Householders

Gray Market Is Reviving

BY RICHARD H. STERNS
Staff Correspondent of THE WALL STREET JOURNAL
PORTLAND, Ore.—"Sold out!" That sign hangs on the doors ...
West Coast's ...



Fully Hydraulic and Automatic in operation the "VB" Press saves on materials, floor space, labor and gluing time. It is constructed of an all-welded iron frame and comes completely equipped with motor, pumps and controls. The "VB" Press is producing quality plywood at lower costs for plants throughout the country. Available in sizes from 36x52" to 50x100" or to your specifications.

WRITE TODAY—Get full information and prices, also reprint of the story of the "Plywood Boom".

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BERTHELSEN ENGINEERING WORKS
P. O. Box 1423, Lockport Rd., Joliet, Ill.

CONTOUR SANDING

with a National Sander

National's Model 300 two-pad, reciprocating, straight-line action air sander is ideal for contour sanding. Equipped with molded rubber pads, this machine sands curved surfaces as easily as flat. For different operations, seven easily interchangeable pads are available. You will save time in filling, sealing, and rubbing if you use the 300 for all operations. The vibrationless National Model 300 will increase production and give a better finish.

Write for Details Today

NATIONAL AIR SANDER, INC.
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season for a few days and are then sent to the bandsaws, where they are cut to shape. Routers add the "f" sound holes and the rectangular openings for the electromagnetic pickup units, and the parts are ready for assembly.

Assembly

The assembly is relatively simple. Top and back are glued to a reinforced rim and the neck and fingerboard are installed. The completed instrument is sanded and sprayed with multiple coats of gloss lacquer and the final coat is sanded and rubbed to bring out the high luster desired.

Next comes the installation of the electronic parts—the pickups and their controls. The steel strings, vibrating in the magnetic fields of the pickups, generate minute electrical impulses which are transmitted through the microphone cable to the amplifier and finally to the loud speaker, which reproduces the impulses in the form of the original sound made by the string.

The location of the pickup with reference to the bridge determines the ratio of fundamental to harmonic content of the tone. The closer the bridge is mounted to the pickup the greater is the ratio of harmonic to fundamental tone generated in the pickup coil. More than one pickup is used when the widest possible tone range is desired. Professional guitars are commonly equipped with three pickups, each individually controlled.

Before a guitar is shipped it is strung and tested by Gibson's final inspectors who are also musicians. The last, precise adjustments are made at this time and the instrument, having passed the inspector's critical tests, is ready to go —and ready to be played when the customer lifts it from the case.

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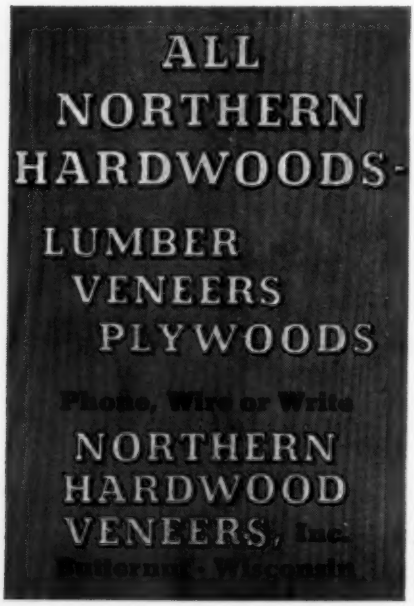
The End



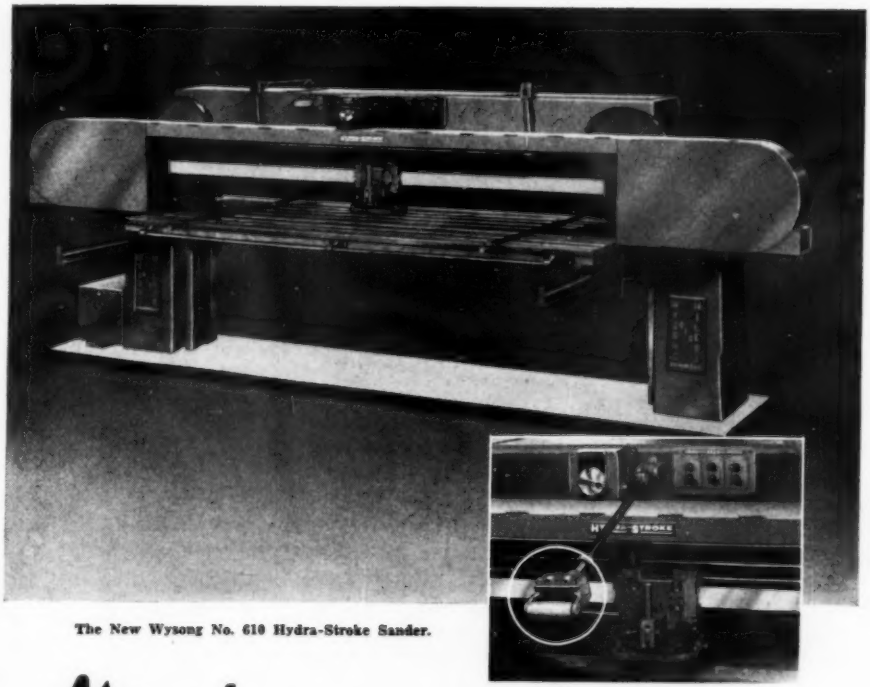
INDUSTRIAL ADHESIVES

Properties of over 100 industrial adhesives, coatings and sealers are tabulated in a new illustrated catalog available from Minnesota Mining and Manufacturing Co.

The 32-page booklet—"3M Adhesives, Coatings and Sealers"—announces that more than 1,000 formulas are available, and offers research help for industrial customers in selecting the right product for the job.

The three tables of properties cover: 64 adhesives for bonding metal, rubber, glass, plastics, fabrics and wood to themselves and to other materials; 18 sealers such as used in manufacturing auto bodies, refrigerators, fuel tanks, wood decks, and pressurized aircraft cabins.

Write to Dept. WD, Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn.



The New Wysong No. 610 Hydra-Stroke Sander.

Push-Button Sanding. Note the new finger-tip control (circled) for changing stroke length.

New!

Faster, More Powerful, Push Button Sander — With a Velvet Smooth Hydraulic-Stroke

THIS IS IT! The rugged, tough, production line sander with the sensitive sanding touch. All previous flat belt sanding production records go toppling wherever the new Wysong No. 610 Hydra-Stroke goes to work.

POWER TO SPARE . . . A powerful hydraulic pump driven by a 7½ H. P. motor delivers more than enough hydraulic power . . . one user reports continuous cross-cut sanding at full speed all day long, without any time loss from kick-outs or overheating . . . Cut faster and deeper without a murmur of protest from the New Wysong No. 610

POSITIVE, FAST, STROKE LENGTH SETTING . . . Push buttons at the finger tips on the stroke lever handle, set the length of stroke. It takes only a moment. The operator doesn't even shift his weight or his hands to change the stroke length . . . and when the stroke is set, it stays. No creeping stroke change to waste time and spoil stock edges . . . One user reports that he sands an extra truck-load each day during time saved by this feature alone.

ALL THE SPEED AN OPERATOR CAN HANDLE . . . Ninety strokes per minute at 8-foot setting; 100 at 6-foot setting: proportionately faster on shorter strokes. Your operator will marvel at the way the new Wysong No. 610 increases footage without additional work on his part.

A LIGHT TOUCH by the operator is all that it takes to control the perfectly balanced sanding pad carriage. Polish the thinnest veneer or cut down rough stock without strain. The sanding pad carriage moves on a hardened steel bar with perfect bearing. It can't rock to dig-in and gouge stock.

LESS MAINTENANCE . . . Only two external lubrication points. All other moving parts run in a fully enclosed oil bath. No oil dripping to damage stock and dirty the floor.

IN ADDITION . . . you get all the advantages of Hydraulic Stroke sanding . . . uniform stroke speed for smooth, even sanding and finger valve control of stroke speed . . . plus push-button control to start or stop belt, raise or lower table and start or stop hydraulic stroke. The Wysong No. 610 Hydra-Stroke truly gives you push-button control of sanding machine operation.

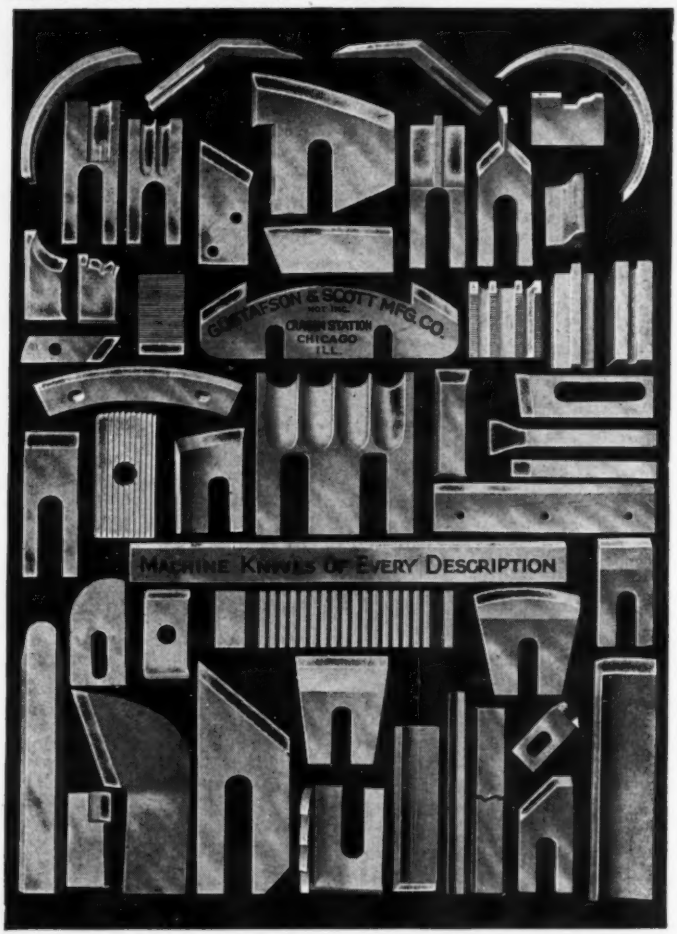
YES . . . this is it! The finest flat belt sander ever built. You'll agree when you see the New Wysong No. 610 Hydra-Stroke in operation.

See your dealer or write to the factory for full information.

WYSONG and MILES Co

GREENSBORO, NORTH CAROLINA

Do You Have a Knife Problem?—*SEE US!*



Over a half century of experience in the designing and manufacturing of woodworking machine knives is your assurance of getting highest quality tools, properly engineered for your job.

GET OUR QUOTATIONS BEFORE PLACING YOUR NEXT ORDER!

GUSTAFSON & SCOTT MANUFACTURING CO.

1637 N. Lowell Ave. — Chicago 39, Illinois

BETTER *rides for furniture*

PART 2
BY S. L. SWENSON

In this second article of the series Mr. Swenson discusses Overstuffed Furniture. The series will be concluded next month with suggestions for protecting Tables & Occasional Furniture.

IMPROVED PACKAGING of overstuffed furniture is one of the "harder nuts to crack." Frequently, because there is no obvious solution, some plants continue the use of packaging of 25 years ago. We are not trying to sell the overstuffed people short, but the fact is, packaging improvement in that branch of the industry have actually been fewer than in any other.

Probably the most glaring fault of many overstuffed-furniture packages is that the packs fail to "sell" the merchandise, and frequently the package is a distinct drawback. A successful package must re-sell the product to the customer after it arrives at the home.

Consider the many times you have opened a shipment of merchandise—furniture or other—in your living room. Every once in a while didn't a lot of scraggly, dirty packing shreds litter up the room? And you didn't like it, did you? Your dealer doesn't always open your package first, and clean up the mess. And the customer—yours and your dealer's—isn't going to like a mess any more than you did. If you're packing that way, consider you have a black eye in your customer's mind. For every one customer that is sufficiently angry to complain to the seller, remember—there are 25 more who grumble, don't report their "beef," but never purchase again from the same place.

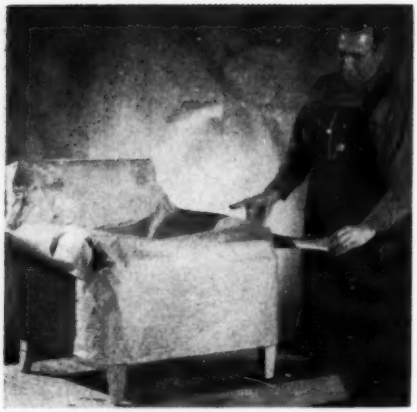
Protect all contact areas from rubbing and scuffing. Cover vulnerable spots that contact paper wrappers or corrugated fibreboard surfaces, with pads of cushioning material. Upper surface of backrest, arm rests, and other prominent parts need covering carefully and completely. Use good quality cushioning, of sufficient size — don't skimp, it doesn't pay off—and tie the pads securely.

Consolidated Freight Classification Package "4-F" gives the story on railroad shipping package requirements for overstuffed furniture. Check it thoroughly.

Certain kinds of pads are clean, and remain so despite rough treatment, gouging and tearing. Others are clean to begin with, but when a tear occurs, the contents turn into the mess above mentioned. In addition, the padding protection often streams out with filler.

Creped cellulose wadding pads have a characteristic "clinging" surface, making them ideal for many upholstered padding applications. They stay on the top rest and back rest without tieing.

Mr. Swenson is product engineer, Kimpak Crepe Wadding, Kimberly-Clark Corp., Neenah, Wis.



Wadding is held in place by gummed tape.

Most of the time, it is necessary only to tie the overwrapper in place, the creped cellulose pad then holds securely without additional help.

Is your upholstered fabric "compatible" with the covering sheet or blanket? You'd be surprised how many are not! Certain kinds of fabric just "don't go" with some papers, burlap or fabric coverings. Examine the protective blanket or wrapper carefully. Does it contain a filler, waterproofing, or asphalt binder which will be injurious to your fabric. Plastic surfacings, particularly the flexible (plasticized) vinyl films are susceptible to discoloration by asphalt laminated papers. Dark brown, blotchy spots appear making the furniture surface completely unacceptable. And it's usually impossible to remove such asphalt discoloration stains.

Some low-grade cotton blankets, both for upholstering and protective shipping, contain excessive cottonseed oil. Such oil often "bleeds" through its wrapper or other padding, and appears in the fabric as a grease or oil stain. Cotton should be of the "degreased" grade to insure good performance.

Blond wood surfaces, if oil rubbed, usually have a film of oil remaining which is a hazard, unless your padding or blanket protection is top grade. Asphalt laminated papers, and blankets lose their asphalt, by the dissolving action of the rubbing oil film. This asphalt turns into various shades of brown discolorations which are most apparent on blond wood finishes. Wrappers containing scrap furnish, newsprint, etc., all too often contain ink and dye specks which "transfer" to wood finishes. This "transfer" action again is facilitated by any remaining rubbing oil on your furniture surface. Rub out and dry furniture surfaces so they are as free from oil as possible. The hard parts to get, of course, are the corners, joints, edges, etc. Any remaining oil in these hard-to-reach places migrates in time to adjoining flat surfaces. If a contact pad with stain possibilities is present, the oil sets to work on it.

Consider the use of cushioning material in roll form. Sure, a lot of plants have used, and still use, pads and blankets in sheet form. Many operators don't know there are other ways to operate — possibly more economically.

There is a strong case for the use of cushioning material in roll form. Briefly, you convert the roll to your necessary sheet size at the point where you wrap the furniture. The manufacturers, as a rule, don't care whether you buy the cushioning in rolls or sheets. They sell the same amount of material, rolls being slightly lower in cost. Why not look over the roll situation? Some big, important, assembly-line type manufacturers of furniture are now using roll stock for cushioning.

Here are a few advantages in using roll stock. The price is lower. Roll cushioning stock as a rule is from 10 to 25% lower in price than pre-cut sheets, for the same area of coverage.

Lower inventory requirement. Both in volume of packing material, and in dollars of stock necessary to function properly. Several rolls of properly selected widths, are usually all that is needed. Since one width roll can usually satisfy the width dimension on many sheet sizes, the other dimension the length cut-off, can be made to suit at the point of use.

Storage along the assembly line is cut to a minimum. Rolls are mounted on simple spindles slung from the ceiling. They contain hundreds of feet of packing material and need be changed only after many items are packed. Ceiling space is usually wasted in a plant; floor space is valuable and expensive to allocate to anything but a productive item. Store and use rolls from ceiling hangers.

Flexibility of padding size possibilities is improved. When you unexpectedly change a cutting, the problem of what to do with all the extra sheet pads for the old cutting is a question. You either use a wasteful oversize pad on the next cutting, or store the pad for later use because it is too small. Several roll widths practically eliminate this problem—simply place a suitable width roll on the spindle and select a new cut-off length.

Adaptability to preparation of small and super-thick pads. Roll stock is usually of such form that it can be cut into little pads without destroying the padding. A large share of the tailor-made pads in sheet form, cannot be cut down, without the "filler" leaking out. Where concentrated or extra-thick pads are needed, "roll" padding is most easily and quickly converted into such sheet sizes that it can be folded into double or triple thick form. It is not necessary then, to place special orders with your supplier, for extra thick pad requirements.

Unrolling cushioning material to fit contours of the piece of furniture. Note tying at legs.

Perpetual stock of padding in packaging and shipping room. The labor involved in shuttling various sized pads to and from your shipping room is reduced to a minimum. Each time you change a cutting, with sheet pads, it is necessary to get a new size from storage. With rolls, switch from one size, overhead (mounted on your ceiling spindle) and change the specified cutoff length.

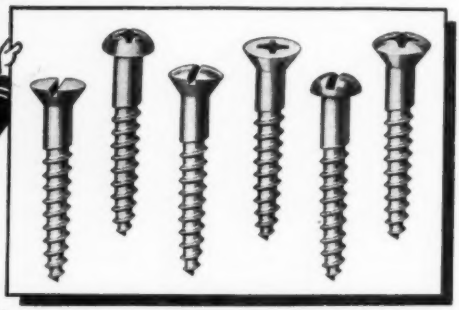
To insure accuracy of cutoff, most manufacturers use a guide-board, clamped in position on the work table to assure correct length. The roll stock is simply pulled to the guide or stop-board, a hand operated counter-weighted shear knife drops across the roll clipping it in one operation to correct length.

Shear knives used for cutting padding in furniture plants are frequently made in the plants' own millwright shops. They look like, and operate on the same principle as the photographers cutting or trimming board, only on a larger scale. Hand operated shear knives can be up to five feet in length and are surprisingly easy and safe to operate

Pheoll

WOOD SCREWS

- Reduce Assembly Time
- Join Parts Better
- Improve Product Appearance



Other Typical Pheoll Products

Machine Screws, Tapping Screws, Cap Screws, Set Screws, Stove Bolts, Machine Bolts, Machine Screw Nuts, Phillips Recessed Head Screws and Bolts, Sems (Lock Washer Screws), Special Cold Headed and Threaded Products.

Use of Pheoll standard and special wood screws reduces overall assembly time and provides the means for joining parts tighter and stronger. Also, they improve the final appearance of your products.

These quality screws are made from cold forged blanks—individually turned, providing clean cutting edges free from nicks and burrs. The sharp gimlet-type point penetrates the wood for a straight and rapid driving start. Spiral threads seat firmly in the wood, providing a rigid bond that resists strain and vibration. Pheoll wood screws are available in slotted or Phillips recessed head types—in a broad range of sizes—all head styles, different metals and in all finishes. Ample stocks of steel and brass wood screws are always carried in stock.

Pheoll MANUFACTURING COMPANY • 5700 Roosevelt Road Chicago 50, Illinois

SCREWS • BOLTS • NUTS

Industrial Fasteners and Holding Devices

if properly counter-weighted and guarded. Their inertia, due to size, enables shearing off a complete blanket 40", 48" or wider in a single stroke.

Use of idle, fringe labor is facilitated by having an "odd", sheet-cutting job available. Despite staff planning, plant managers often find some assembly operations near the close of a shift are completed before others. Rather than leave labor standing idle during closing periods, the "fill-in" job enables profitably utilizing these people. A number of sheets for current cuttings can accordingly be made up in advance for following shift packaging operations.

The End

A South Sea Islander with a ring in her nose is a savage, but a New Yorker with a pearl screwed to her ear is civilized.

—Kreolite News

here's real value!

. . . acclaimed in every field

Here's a quality electric sander at a price that means real value. Compare the Model 200 Electric Sander with any other production line sander on the market . . . compare and you'll buy the Model 200.

Compare these features

- 100% ball bearing construction . . . sealed and shielded . . . no lubrication or filtering of dust required.
- 115 volt induction type motor . . . 50-60 cycle . . . 3450 RPM . . . gives fast rotary action sanding.
- Direct ball bearing drive gives longer life. Elimination of gears means lower maintenance cost.
- Scientific counter-balance minimizes vibration . . . reduces operator fatigue.
- Heavy duty switch with 100% overload capacity.
- High volume fan with controlled air flow keeps operating temperatures low.
- 33 sq. in. oil resistant rubber pad (4½" x 7½") takes half a standard abrasive sheet. Can be used for either dry or wet finishing.
- Weight 9 pounds . . . for easy non-tiring use.

Compare this price **$39.95**

Compare this warranty **full year unconditional guarantee against any defective material or workmanship.**

Make this comparison **TODAY**

See and try the Model 200 at your nearest dealer. Stocked by leading industrial and hardware distributors in most cities.

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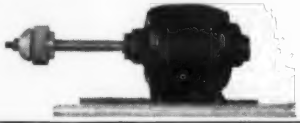
M. F. Huseby Co.

PEARSON *Versatile* MODEL A SANDER

America's FASTEST AND MOST EFFICIENT SANDER for IRREGULAR SHAPES

With BELT SANDER ATTACHMENT an ideal ALL-PURPOSE SANDER



SAVES ONE OR TWO OPERATIONS

MOTOR IN HORIZONTAL POSITION

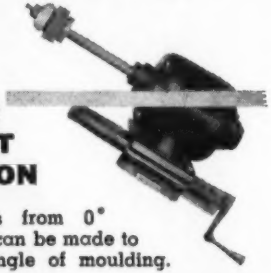
5 DAYS

By permitting motor shaft to tilt until sanding head angle perfectly fits

SAVES ONE OR TWO OPERATIONS

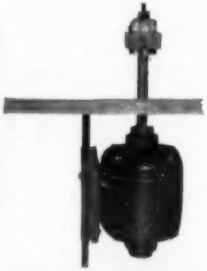
MOTOR IN HORIZONTAL POSITION

5½ inch head can be raised 2 inches above table level. Table can be lowered 2 inches to give 4 inch clearance.



MOTOR IN TILT POSITION

Tilt ranges from 0° to 90° and can be made to fit exact angle of moulding.



MOTOR IN VERTICAL POSITION

Motor can be raised 6 inches on motor base. Whole motor unit can be raised 9 inches additional, or 15 inches in all.

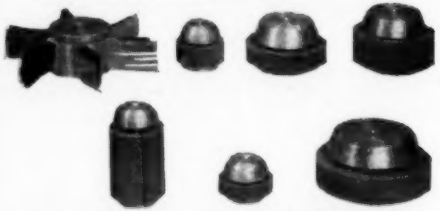
5 DAYS FREE TRIAL

We are so thoroughly convinced of the efficiency and economy of our machine that we do not hesitate to offer it for sale with the understanding that if it does not reduce your previous sanding costs sufficiently to justify the purchase of the machine, we will accept its return at no cost to you.

By permitting motor shaft to tilt until sanding head angle perfectly fits beveled moulding angle, this machine cuts and polishes one or more step-downs at the same time. Furthermore, the rubber cushions hold their shape many times longer than felt.

SAVES 60% TO 80% IN SANDCLOTH

For instance, one strip 1"x17" (17 sq. in.) on this machine will do more sanding and last longer than one square 8"x8" (64 sq. in.) cut into a disk, hole punched, slit and tucked into place around an old type cushion. The saving on sandcloth alone oftentimes pays the cost of a Pearson Model A.



7 HEADS - 14 CUSHIONS

Are standard equipment with each machine. Length of cushion ranges from ¾ inch to 4 inches. Outside diameter ranges from 3¼ inches to 7 inches.

PEARSON SANDING MACHINE CO., INC.

HIGH POINT, N. C.

ALSO MANUFACTURERS OF WATERFALL BELT SANDERS, BLOCK AND EDGE SANDERS, AND GRILL SANDERS.

Courtesy Majestic Wood Carving Company

PYRO-CELLO-FILM

protects the world's finest mastercraft wood products

SUPERIORITY UNIFORMITY
PYRO-CELLO-FILM
THE AMERICAN VARNISH COMPANY • CHICAGO 22, ILLINOIS
ESTABLISHED 1883

Check ✓

THESE OUTSTANDING ADVANTAGES

- ✓ Adds Sales Appeal
- ✓ Provides Durable Protection
- ✓ Absolutely Heat Resistant
- ✓ Impervious to Fats and Greases
- ✓ Superior Alcohol and Acid Resistance
- ✓ Positively Moisture Resistant
- ✓ Exceptionally High Scratch Resistance
- ✓ Laboratory Tested—Proven in Use

Increasing numbers of manufacturers of fine wood products use PYRO-CELLO-FILM as a finish that will retain its original luster and loveliness through years of usage and wear. This amazing new *coat of protection* may be applied to all woods and wood veneers by the usual commercial methods without use of special equipment.

Over 60 years experience in the development and manufacture of outstanding finishes enables us to help you with any special wood finishing problem.

THE American VARNISH CO.
ESTABLISHED 1883
1126-40 NORTH BRANCH ST. CHICAGO 22, ILLINOIS

WRITE, WIRE OR PHONE *Today...*
for complete information about PYRO-CELLO-FILM and its application to your wood products.

BY H. H. CONNELLY

HOW IS YOUR SANDING I.Q.? Part 2

New Abrasive Bonding Agents

TODAY'S SKILLED furniture maker little realizes the revolutionary, far-reaching changes that have made it possible for him to dive into a box and come out with the exact abrasive needed for each progressive step in the process of creating a piece of fine furniture.

The cabinet maker of George Washington's and Thomas Jefferson's day had to call time out occasionally to cook up a batch of sandpaper to finish a chest or bed. His method of preparing sandpaper was simple. He first spread a film of stinking hide glue, brewed from cow hides and pig knuckles, on paper and by sifting sand through a crude screen covered its gummed surface. The excess sand was blown off when dried and the paper was ready.

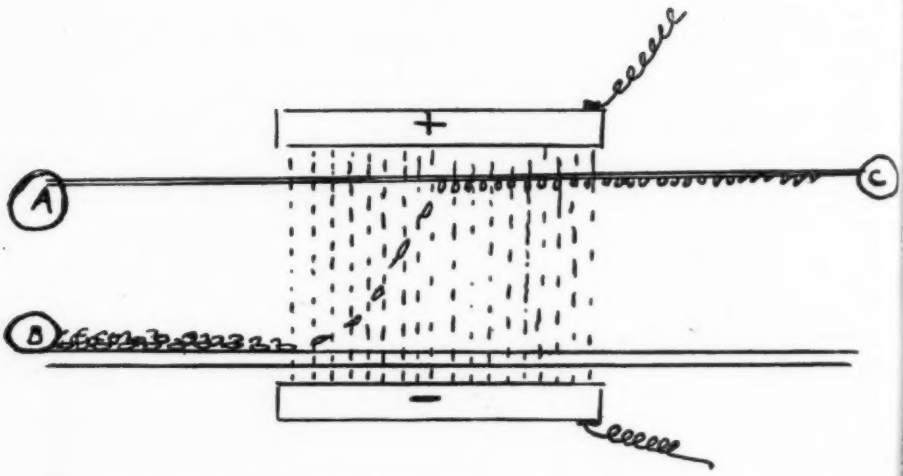
The air was undoubtedly blue around the frustrated artisan when he discovered deep scratches from a few large grains of sand which had slipped through the unpredictable screen.

Surprisingly enough hide glue is still a major adhesive for gluing abrasives to paper or cloth. Most manufacturers employ the best, first run hide glue for this bonding operation.

Since hide glue is sensitive to dampness, you will find it good economy to protect all sandpaper while in storage from high moisture conditions as well as extensively dry weather. Belts that are made far in advance of their requirement should be carefully stored or undue waste from shortened belt life will result. Direct sunshine on abrasives in storage weakens their strength and makes the backing brittle.

With the comparatively recent development of synthetic glues, abrasive manufacturers have kept pace by making use of the phenol-formaldehyde glues, a pronounced improvement in bonding abrasives to paper or cloth. Since phenolic glues are waterproof, they remain stable through either dry or damp weather. The only noticeable change is a slight cupping of the backing. It is waterproof on one side and subject to expansion or contraction on the reverse side. This is minimized when the backing has been treated on the reverse side for moisture absorption.

The phenolic bonded abrasives are not effected by friction heat and will hold the abrasive longer without breaking down. Hide glue, on the other hand, will soften and cause burning



In the electrostatic method of applying abrasives to a belt, the abrasive grains are moved through an electric field on a conveyor belt B. As the grains approach the field of electric impulse traveling from the negative plate to the positive plate they are picked up and deposited on glue coated belt A where they remain suspended with the long axes of the crystals perpendicular to the belt. In this position they are anchored firmly and most effectively for cutting.

under the impact of excessive heat.

Real economy can be made the user of phenolic bonded sandpaper on sanding operations where the abrasive has to be destroyed because of filling. Being waterproof, phenolic bonded abrasives can be soaked in water to loosen the filled grains without losing the bond. Some concerns have been known to use one loading on drum sanders for as long as four months before renewing by the simple practice of cleaning the paper. This is sad news for the abrasive manufacturers looking for increased sales, but sound economy for the user of sandpaper.

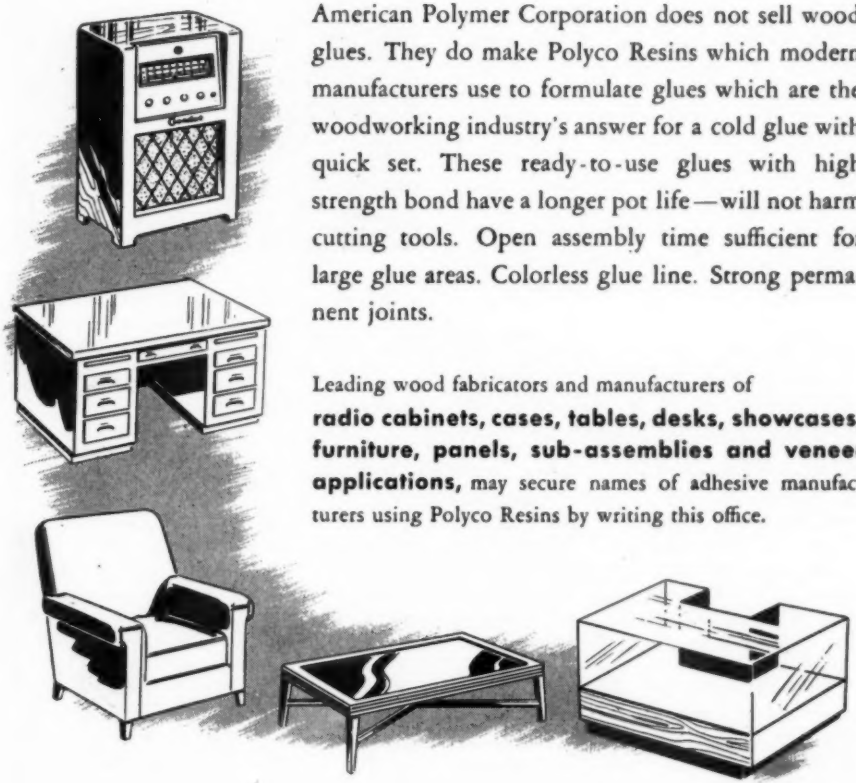
Since phenolic bonded paper costs more, its use is discouraged from the start. A manufacturer who is seriously considering using it should first check the saving that could be expected by a trial run, keeping a careful check of production and the number of belts used against the same stock run by the regular belts.

Choose Paper With Proper Backing

The variety of backings obtainable for abrasives are not quite as numerous as the grit sizes, but sufficiently varied to give the woodworker a wide choice in selecting the most economical backing for the job. The selection of cloth when paper will do the job with equal efficiency, means many dollars thrown to the waste box. Equally wasteful is the use of a heavy paper backing when a lighter paper will do.

Paper backing is now obtainable in five weights: (1) The "A" weight is very light and pliable for extremely fine operations—usually finishing paper. On the paper maker's scale it weighs only 40 lbs. for each ream of 480 sheets, size 24x36". It can be used extremely successfully on oscillating hand sanding machines as well as hand block

Reduce glueing time and costs with QUICK SET COLD GLUE!



American Polymer Corporation does not sell wood glues. They do make Polyco Resins which modern manufacturers use to formulate glues which are the woodworking industry's answer for a cold glue with quick set. These ready-to-use glues with high strength bond have a longer pot life—will not harm cutting tools. Open assembly time sufficient for large glue areas. Colorless glue line. Strong permanent joints.

Leading wood fabricators and manufacturers of **radio cabinets, cases, tables, desks, showcases, furniture, panels, sub-assemblies and veneer applications,** may secure names of adhesive manufacturers using Polyco Resins by writing this office.

POLYCO

★ AMERICAN ★ POLYMER CORPORATION

General Offices: **103 Foster Street, Peabody, Massachusetts**

sanding. (2) Cabinet paper, designated as "C" weight, is best for sanding of wood in the "white." Since this paper weighs about 70 lbs. per each 480 sheets, it is strong enough to withstand medium sanding, that is sanding where the paper wears out rather than made useless by filling. It is most economical on operations for touching-up small defects by hand before finishing. (3) The "D" weight papers are for medium-heavy work, and find a greater use on the heavier abrasives where the paper wears faster than the abrasives fill. An example of poor economy is paper so light it is lost by tearing before the grit wears out. (4) "E" weight paper weighs 130 lbs. per ream. It is heavy enough to provide ample backing for medium machine sanding, such as the vertical sander or stroke sander.

Many firms are under the impression cloth backing is the only economical belt to use on these sanders. This has, in many instances, grown out of the failure through tearing or breaking of a few "E" weight belts because of faulty splicing or the operator's failure to allow for shrinkage or expansion while sanding. If it is remembered that paper like the wood from which it was made, expands and contracts with the absorption or giving up of moisture with the changes in climatic conditions, many useless breaks will be avoided.

One operator was firmly convinced nothing but cloth backing would run on the flat bed sander he was operating. Repeatedly he had hopefully tried paper but after a few hours running the belts broke. It was pointed out that the paper contained a higher percent of moisture, from absorption of humid air conditions. When spliced and after running a few hours the friction heat of sanding dried the paper and shrinkage resulted. A few minutes of readjusting the belt tension after it had been in operation and had begun to show strain

Cutting the belt, the first step in making sanding belts. Note the knife set at 45° in the table for ease of handling. The paper or cloth rolls are placed on the pipe reel shown at the end of the bench. One roll has been skived on the end ready for cutting to length.

corrected the fault with a saving of 50 percent in sanding costs.

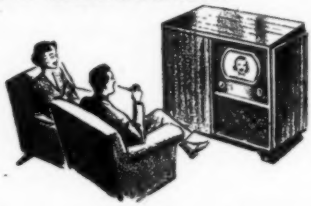
A fifth paper weight called "2XD" is now being marketed by one abrasive company. It is twice "D" weight plus a laminated bond and weighs 185 lbs. per ream. It is a heavy paper devised to retain the non-peeling and better balance advantages of the "E" weight. It provides a better cushioning effect and has proven astonishingly superior on some drum sanding operations where previously difficulty was encountered in keeping the paper on spiral drums. One concern had gone to cloth backed abrasives in disgust until the "2XD" weight was tried successfully.

Cloth backing can be obtained in two weights: (1) "J" weight, which is a specially woven cotton jean, filled to provide a tough but flexible backing for hand use and on machine sanding of mouldings where a flexible curvature

SAVE SANDING COSTS!

How Production-Wise Manufacturers Save Time and Money with AP JEWEL ABRASIVES

50% IMPROVEMENT



Reports this prominent manufacturer of fine radio cabinets after switching to AP's Bondite New Process Paper Belts. Made with AP's exclusive Velvet Joint that never jumps or scratches, these belts out-performed *all* previously tried abrasives.

JEWEL BELTS FOR JEWELRY BOXES This manufacturer was having trouble finding an abrasive that would bring out beauty of grain in wooden jewelry boxes — give satisfactory wear too. Tried AP Jewel Bondite Garnet Paper Belts — says, "Results best we've ever had!"

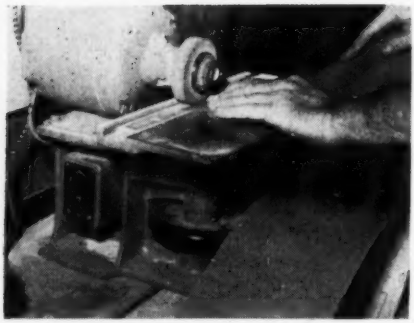
800% INCREASE

in drum sander production is reported by this manufacturer after changing to AP Bondex Garnet Fibre. He calls it, "The toughest, longest-lasting abrasive ever developed for the wood-working industry."

Whatever you manufacture, there's an AP Jewel Abrasive made to do faster, better work — at lower cost — for you, too. Try AP and see! Contact your distributor or write us direct, now!

Abrasive Products, Inc.

SOUTH BRAINTREE 85, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES



A skiving machine removing the abrasives from sanding paper, the second step in preparing abrasive for belt making.

is required such as form moulding. (2) The second grade of cloth is the standard heavy filled cotton drill called "X" weight and is best on machines where wear is excessive. Since this type of backing is necessarily expensive, a careful check should be made of all operations where it is being used.

In selecting "J" weight backing for a moulding job the flexibility should be specified, since it can be secured in either one, two or three way flex or unflexed. The degree of flexibility needed would depend upon the complexity of the moulding.

Make Your Belts and Save

If your plant is buying belts, try making them. You will realize a saving of 30 percent through this source alone.

In nearly every plant there are slack times for the millwrights, oilers, saw and tool room helpers, or even clean-up men who are, if properly instructed, quite capable of producing more than enough belts for the average department.

Very few tools are needed to set up a complete belt making operation. There are: (1) skiver, (2) clamp, (3) knife, and (4) bench.

A skiver is a fast turning, grinding wheel and an adjustable table to hold the material to be skived. As the coated material passes under the wheel, the glue and grain are removed to the desired width of lap, to produce a smooth surface to which the other end of the belt is glued.

A simple clamp for holding the glued joints together until the adhesive sets, can be made in any factory shop.

The knife for shearing the paper is fastened rigidly to the table near the supply of paper at a 45° angle to the table edge. It is simple in design and easily constructed. The table should be two feet wide and longer than any belt to be made.

By following the four easy steps outlined below little difficulty will be encountered in producing satisfactory sanding belts with either cloth or paper backing. (1) Roll the belts across the knife cutting the first 45° line. The belt is pulled across the table top until the heel of the 45° angle lies on the pre-determined belt length mark. This mark should be the length of belt around sander pulleys, plus a one inch

A simple clamp for holding the glued joints firmly while setting. The clamp is swiveled and can be swung in either direction 45°.

Announcing

THE NEW UP-TO-DATE TENONING MACHINE

Now available to U. S. manufacturers is the well known FESTO line of woodworking equipment. Made in Germany, FESTO machines are world-renowned for their efficiency . . . Illustrated above is the new Tenoning Machine which was displayed at the First International Trade Fair in Chicago last summer. Sturdy yet simple in construction, the FESTO is capable of cutting to length, cutting the tenon and counter profiling with a short working stroke. Send today for complete details on this modern low cost machine which is effecting economies in woodworking plants.

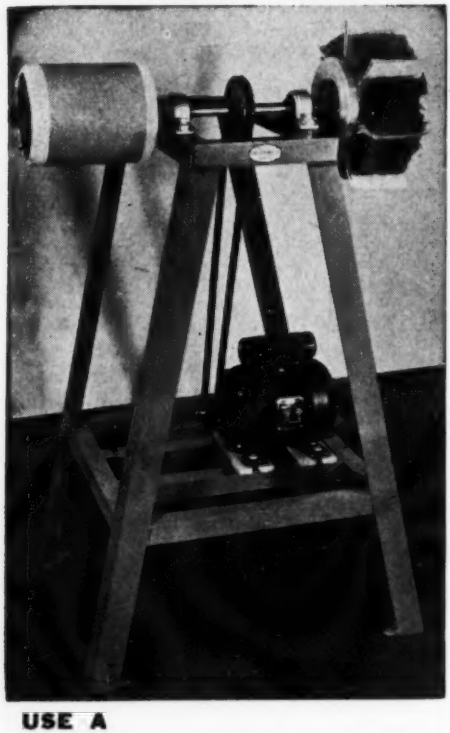
Other FESTO equipment includes Chain Mortising, Drilling, Shutter Grooving, Universal Dovetail Grooving Machines . . . Circular Saws, Radial Saws, Polishing Machines, Sanders. Write for catalog and price data.

Festo

SPECIAL WOODWORKING MACHINES

745 — 51st STREET, BROOKLYN N.Y.

LOWER YOUR SANDING COSTS



USE A

Sand-Rite "DUO" Sander

Get A-1 finishes on all types of wood products with rounded contour and irregular shape, such as—

- CHAIR ARMS & LEGS
- TABLE LEGS
- GUNSTOCKS
- BRUSH HANDLES
- TOYS
- GOLF CLUBS
- MOLDINGS
- DISPLAY FIXTURES

The Sand-Rite "Duo" Sanders are available in floor models as illustrated or in handy bench models. The "Duo" will save you labor time and abrasive materials and give you finer finishes.

WRITE TODAY FOR INFORMATION

SAND-RITE MFG. CO.

Dept. W

226 W. Schiller St. Chicago 10, Ill.

lap allowance. When the desired length has been measured, the belt will be laying across the knife as the starting point for measuring the belt length. It is simple to shear the belt at 45° to the desired length. (2) The belt is then skived on both ends and the abrasive removed to the width of the lap. (3) Glue is applied to one surface and (4) the joints placed under pressure until set. Care must be taken at this point to line the belt edges when applying pressure or a crooked belt that tears easily will result.

This type of joint leaves an area the width of the lap bare of abrasive, but a surprisingly smooth running belt without the customary bumping encountered by belts with a thick joint will be the result.

Some concerns skive one end of the belt on top and the other on the bottom. A joint made in this manner is smooth running with no skip in the abrasive when the belts are joined. It is weakened by the amount of backing removed in reducing the joint thickness to that of the belt. For this reason the first method is recommended over the second, since the small area bare of abrasive is negligible in relationship to the total belt area.

Sanding Belts Need Checking

Are you sure your workmen are using a belt until its usefulness is depleted, or are they throwing your money in the trash box?

The time to check a boat for leaks is before sailing. The time to check a belt for usefulness is before it has been destroyed. One factory found a decided increase in sanding belt costs after piece rates had been put into effect. A check showed the ingenious workman had discoyered that by discarding a used belt long before it had worn out their production earnings could be advantageously helped. He probably wasn't aware that the belts he threw

FAMOWOOD PLASTIC

LET'S GET FAMILIAR— TEST US WE'LL PLEASE YOU

You won't know what FAMOWOOD can do for you until you TEST IT. Scores of plants—large and small—have been pleasingly surprised. HAVE BECOME REGULAR USERS, after putting FAMOWOOD through its paces—for filling cracks and large and small holes.

Production men tell us "they like to use it." IT DRIES QUICKLY—SANDS EASILY—DOESN'T SHRINK—and is WATERPROOF and WEATHERPROOF when properly applied. . . . And "it takes spirit dye stains freely."

Again we say, GET FAMILIAR WITH FAMOWOOD. . . . WHITE—and 12 COLORS. Designed for every type of wood finishing: Furniture, cabinet work, plywood and veneers, venetian blinds, toys—PRACTICALLY EVERYTHING IN WOOD. . . . And it sticks to almost every clean surface: Tile, concrete, porcelain, glass, etc.

CONVENIENTLY PACKAGED: 6 oz. cans to 11½ lb. (gallon) cans.

USE FAMOGLAZE, the outstanding companion product, for a PORCELAIN-LIKE FINISH. Especially formulated for hair-line cracks and minor defects. . . . White and mahogany. Use it for the finest finishing, boat hulls, musical instruments, cabinet work, case goods, etc. . . . Also sticks to any clean surface.

FAMOGLAZE keeps both products in top-working condition.

WHEN REQUESTING SAMPLES, GIVE DISTRIBUTOR'S NAME

BEVERLY MANUFACTURING CO.

Manufacturers of FAMOWOOD, FAMOGLAZE and FAMOSOLVENT

9118 South Main Street - Los Angeles 3, California

away were worth many times the additional premium he earned.

A close check of belts can be instituted by one of two methods: (1) Install piece rates whereby the number of belts used are tied in with the production. In other words, place the belts on an incentive base similar to sanding so that the more sanding time an operator gets out of a belt above a pre-determined standard the more he will earn.

Number 2 method is simply a stock solution. When an operator wears a belt out it is returned to the stock room and examined before issuing a new belt. If sufficiently used to warrant a new belt, one is issued, if not it is rejected. Operators have been known to purposely break a belt that has many hours of good sanding left in order to get a new one to increase their production. One plant issues a new belt but tags the broken belt with the operator's name and has it repaired and re-issues to the same operator at the next call. Needless to say few belts were broken intentionally after a trial run.

Summary

Granting your sanding costs are unnecessarily high, what can you do about them? In the first place, there is hope. Production costs are not like taxes which take a major election or an act of Congress to reduce. Manufacturing costs are reduced through wise buying and forethought in planning and improvement. Check these points for ideas if you haven't already put them to use: (1) Learn the characteristics and limitations of the different abrasives commercially used by wood working factories. Apply the best suited to your particular job. (2) Carefully check any new product for economy by long runs. Don't be influenced by a glib tongue. (3) Select the abrasive size by tests

as outlined and use the largest grit that will do the job required by the standards department. (4) Check your present belts for backing. Use paper backing wherever possible. (5) Make your own belts. (6) Set up a system for checking belts that have been used by operators before issuing new ones.

The End

"Only Americans have mastered the art of being prosperous though broke."

Standard of the FINISHING INDUSTRY for 16 years.

DETROIT HANDY "TAC" RAG

DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

FINISHING FACTS

A complete booklet on the finishing and preserving of beautiful wood is now available. As air conditioning, insulation and improved methods of building construction are developed, it becomes necessary to develop new penetrating materials in the finishing of wood. The authors say, "the lost art of subsurface finishing is the only means of securing a rich finish of natural beauty."

After a brief discussion of surface finishes, the balance of the book describes the products handled by General Finishes as well as instructions for types of finishes. These include: lathe finishing, interior trim, staining, etc.

Write to Dept. WD, General Finishes Sales & Service Co., 1548 W. Bruce St., Milwaukee, Wis., for your copy.

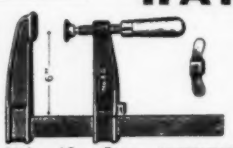
PORTABLE TOOLS

A new 72-page Skil portable tool catalog for the manufacturing, construction and automotive service industries has just been issued by Skilsaw, Inc., Chicago manufacturer.

Over 135 Skil electric and pneumatic tools are completely illustrated and described in this new catalog. The catalog includes complete specifications and features, applications and uses on Skil saws, drills, sanders and many other types of portable power tools.

For a copy write Dept. WD, Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill.

"HARTFORD" CLAMPS

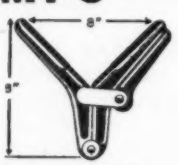


Style 6G: Deep engagement clamps. Quick acting. Take the place of "C" clamps. Speedily adjusted.

Style 5: For interior woodworking, body building, furniture, sash and door manufacture. Rigid action tail piece. Quickly adjusted.

32 Clamp Styles Available.

Write for free catalog Today.



No. 62 Mitre; Planed off jaws with hardened steel pins just long enough to hold work.

The HARTFORD CLAMP COMPANY EAST HARTFORD, CONN. Est. 1915

WOOD Industry Notes

NEW LOCATION

The Bijur Lubricating Corporation, manufacturers of automatic lubricating systems, announce the removal of their headquarters from Long Island City, New York to Rochelle Park, New Jersey.

Their new address is 151 W. Passaic St., Rochelle Park, New Jersey.

UPSON "FACULTY" TO CONDUCT COLLEGE COURSES

An Upson "faculty" comprising eight divisional sales managers of the Upson Company of Lockport, New York will conduct courses in the study and application of laminated wood fibre panels as part of the National Retail Lumber Dealers Association 30-day college training courses, the company has announced.

A wide range of subjects from advertising, sales and legal problems to the technology of different building products, will be covered by the courses. They will continue through most of the winter at various universities.

GARDNER-DENVER ESTABLISHES CANADIAN PLANT

To provide increased service for its expanding Canadian business, Gardner-Denver Company, manufacturer of air compressors and other industrial equipment, is establishing a Canadian plant, officials of the company announce.

The new plant will be located at Brantford, Ontario, and will be operated by Gardner-Denver Company (Canada) Limited. Key production men will be temporarily transferred from the parent plant, Quincy, Illinois, to provide the necessary initial supervision, but both skilled and unskilled labor will be obtained in Canada.

WIEGAND CORP. REPRESENTATIVE

The Henry Wiegand Corporation of 501 Fifth Avenue, New York, N.Y., importers of Woodworking Specialty Machinery announces that they have appointed Claude S. Sutton of Greensboro, N.C. their exclusive selling agent for the state of North Carolina, South Carolina and Virginia. Among the machines to be marketed by Mr. Sutton, will be the Raimann automatic knot boring and plugging machine, the automatic veneer patcher and the Esterer Swedish type gang saw.

MASONITE OPENS NEW PLANT

Masonite Corp. announced its Okiah, Cal., hardboard plant will be in operation by the end of the year.

The multi-million dollar project, described by the company as the second largest hardboard plant in the world,

STOP DUST

DUSTKOPS — **20 Models**

UNIT TYPE
LOW COST

300 to 3600 cfm
¼ hp to 5 hp

AVAILABLE FROM STOCK

For: Grinders, buffers, polishers, woodworking, lint . . . All Dusts.

Send for Cat. 605a; describe problem.

AGET-DETROIT CO. • ANN ARBOR, MICH.

CUT COSTS, make stronger assemblies with QUALITY CONTROLLED "ROCKFORD-PHILLIPS" or SLOTTED HEAD WOOD SCREWS.
Stock of all sizes and head styles ready for shipment.
FOR COMPLETE INFORMATION AND PRICE LISTS WRITE FOR OUR NEW WOOD SCREW Catalogs No. 202 and No. 106.
We fabricate a complete line of STANDARD • AUTOMOTIVE • AIRCRAFT & SPECIAL Threaded Fasteners.
"Quality Controlled" Products
"ROCKFORD" Screw Products Co.
2501 S. Ninth Street
ROCKFORD, ILLINOIS
Phone: 4-9441 or Wire: RK 88

was started two years ago on a 116-acre site about a mile north of Okiah. It now consists of 10 buildings, the largest of which is a 284,000-square-foot structure.

The new unit will manufacture the firm's hardboard solely from western raw materials.

NEW PRESIDENT FOR SKF

Richard H. DeMott, who began as a salesman with SKF Industries, Inc., 35 years ago, has now become president of the ball and roller bearing company. He succeeds William L. Batt who resigned to enter government service.

Mr. DeMott has been vice president in charge of sales since 1943 and played an important part in pioneering the use of anti-friction bearings in industry.

ELECTRONIC HEATING MOVES

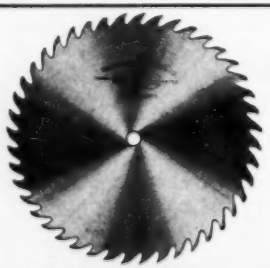
The Electronic Heating Corp., which has been at Cambridge, Mass., recently moved to 66 Needham St., Newton Highlands, Mass.

This firm which manufacturers high frequency bonding equipment, has quadrupled both space and personnel. Present plans include an expanded engineering and service program to develop special adaptions of their equipment for any woodworking purpose.

40-YEAR SERVICE PINS

The first 40-year service pins to be presented to employees of the Black & Decker Mfg. Co., Towson 4, Md. were given to the company's two founders, S. Duncan Black and Alonzo G. Decker, Sr. at a testimonial dinner on October 12th

In line with the company policy of presenting service pins on 5-year anniversaries of employment, the administrative and supervisory groups of the Black & Decker Co. gave the special dinner to make the presentation of the 40-year pins to Mr. Black and Mr. Decker, President and Vice-President & General Manager respectively.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CUT LABOR COST— PROTECT BAND SAW BLADES— CUT MORE MATERIALS!

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Two Atlas Drill Press Heads, Two Mead Air Cylinders, and Mead Cycle Box

Drilling and countersinking corner blocks for TV set cabinets has jumped to 80 holes per minute with this special Atlas drill set-up at Steger Furniture Co., Steger, Ill. That's an increase of 800%, with the machine replacing two full-time employees. The operator simply fills the hopper — work is automatically ejected.

Total cost of this set-up, including labor, was $600 — about 75% less than that of a "special" machine built outside. Chief engineer Pete Tuttle designed it and chose Atlas drills for their bearings, rigid construction, and dependability. Perhaps you can work similar wonders in your plant with accurate, versatile, low-cost Atlas tools. Check with your dealer today.

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MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING

BY LEONARD W. HAGERUP

Material handling in WOOD MANUFACTURING PLANTS

YEAR AFTER YEAR handling objects remains the principal source of compensable industrial injuries, and also they're the main cause of medical cases and disrupted operations. Some of the facts developed in a survey of accidents in the woodworking industry are very interesting.

Out of the 10,000 accidents studied, improper material handling accounted for 42% of the accidents. Slivers were 15%; hand tools, 9%; other sharp objects 5%; strains 5%; objects dropped 2%; hand trucks 2%; caught between objects 1%; and all others 3%.

Before discussing the subject of modern material handling and accident prevention, perhaps it would be in order to define material handling.

Material handling is the movement of materials, no matter how, when or where, within a plant or between closely located plants.

"Long moves," such as those performed by railroads and truck lines, are usually called transportation. However, transportation is closely integrated with material handling.

The short movement of material by hand, by an operator performing a processing operation, is not considered material handling. However, mechanized processing, supply, and removal of materials from any processing operation, and positioning of materials for hand processing, are functions of material handling.

Material handling is not synonymous with mechanical equipment. Mechanical handling is not all fork lift trucks, pallets or conveyors. Material handling studies include flow, transportation, warehousing, etc. Equipment provided, if any, must be the outgrowth of the proper studies. Coordination of flow, planning, scheduling, and package design (of both raw and finished materials) is definitely integrated with material handling.

While the common misconception of material handling limits the sphere to receiving, warehousing (raw and finished materials), and shipping; actually material handling is involved directly or indirectly in all phases of plant operation.

Mr. Hagerup is assistant director of safety of the Lumbermens Mutual Casualty Co., Chicago. This paper was presented during the last year's National Safety Congress and is reprinted with permission.

Why Make A Material Handling Study?

Studying material handling is a sound procedure to use in determining the basic accident prevention problem in any plant. It should be quite evident that accidents from material handling are common in our woodworking industry and should receive more attention than they have in the past.

The planning of material handling procedures in a plant depends primarily upon the form of the materials processed and the handling necessary to carry these materials through the various processing steps.

There is usually just one right way to do a material handling job so that workers will be adequately protected from injury and the work will be done effectively. However, there are many wrong ways. Then workers are being needlessly exposed to injury and operations are clumsy and time consuming.

Basic Approaches Used To Make A Material Handling Study

The greatest efficiency in handling material is obtained when the movement of the material is continuous. There is no fundamental reason why the following basic approaches cannot be applied in any size plant: Keep the material moving uniformly through the processing steps; Minimize unnecessary rehandling; Eliminate heavy manual lifting; Reduce transporting distances wherever possible; Provide special equipment as may be practical.

All such basic approaches tend to simplify handling material, and in so doing the control of accidents is made easier. Where material handling is organized standard safe practices can be worked out.

After we have made the basic approaches and study, how should we plan for safe material handling?

The following should be applied when planning for safe material handling:

1. Raw materials should be provided in units of proper size for use.

2. The greatest efficiency is obtained when the material is received and handled in units that will be required at the point of the first processing operation.

3. Units should not be lowered if they must be lifted later in the process. This applies principally to objects that are handled by hand through a sequence of moves.

4. Handling material equipment that's designed to handle the size and type of material units being moved should be used.

5. At processing points, and storage points, consideration should be given to convenience and ease of handling. In all cases planning is necessary to prevent collapse or tipping of piles; thus you will reduce the possibility of injury to workers and damage to materials.

You can attribute 6% of the handling material accidents to faulty handling. Falling boards accounted for 3% of the accidents; falling objects another 3%. If material is carefully handled, piled and stacked, these accidents will not occur.

When loading material on transporting equipment the method of unloading must be considered. If materials are loaded by use of mechanical means, the method of safe unloading must be determined in advance.

Loads on shop trucks and conveyors must be stable to minimize slips, slides, or tip-overs which will slow up operations and create accident hazards.

Where manual labor is the only method available for handling material, attempts should be made to eliminate vertical lifting by substituting simple methods whereby loads can be pulled, pushed, or rolled. Of course, careful supervision should be maintained to see that this is being done in a safe manner.

Possibly many of you production

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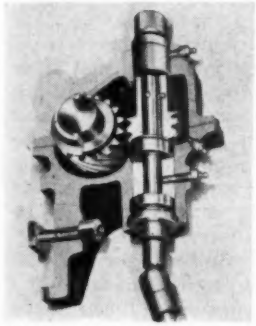
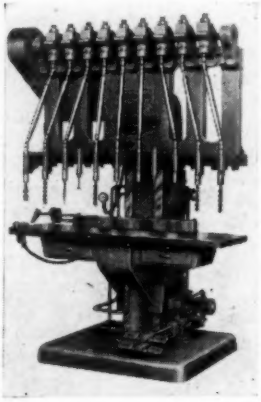
PLUS VALUES FROM ONE ROOT BORER



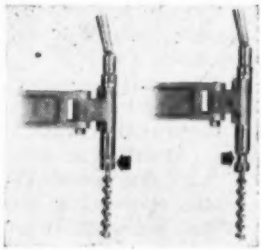
This cut-away view of the upper gear box shows why long life is a stand-by word for users of Root equipment. Noiseless, easy meshing spiral gears, two radial thrust ball-bearings and a needle bearing plus an enclosed housing to prevent the escape of lubricants are the highlights of this gear box. The knob at the top takes gears out of mesh saving wear on unused spindles.

◀ The complete Root Boring Spindle — highly developed, flexible, modern, durable and with a wealth of working features that are the sum and substance of many years of boring machine experience. This spindle is one of the many "plus" values received with the purchase of a Root Gang Borer.

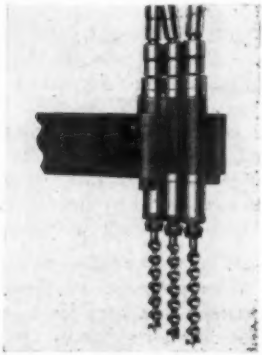
The popular Style CH Hydraulic Feed Multiple Borer is exceptionally versatile for any woodworking plant. The spindles can be placed anywhere on the machine for boring straight-line rows of holes or patterns of irregularly spaced holes on close or extended centers. Write for free literature on this and other Root Borers.

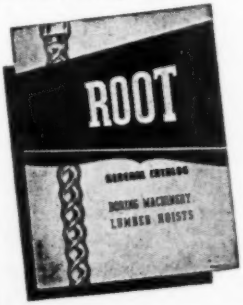


The "swing-nose" feature allows nose of spindle to be swung right and left through more than a half circle. Hard-to-get holes are reached without trouble. This view shows three spindles arranged across the width of the boring table, an impossible accomplishment without the swing nose feature. ▶



Many savings and conveniences accrue by the use of depth adjustment on spindles. Bits of uneven length can be lined up so all will bore to exact depth, particularly useful for counterboring in multiples. Spindle noses can also be adjusted for different depth holes at same set-up.





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- Horizontal Multiple Spindle Borers
- Single Spindle Borers
- Power or Foot Operated Machines
- Multiple Spindle Boring Heads
- Lumber Hoists
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minded men will ask this question: "How do new production methods effect material handling?"

The following items have a bearing on this question when you consider safety in material handling on a production basis.

1. Skilled machine operators should have a minimum of material handling work to do.

2. Generally, materials should be supplied and finished parts removed, at frequent intervals rather than in large quantities at long intervals.

3. Adequate working area for every machine operator is necessary.

4. Aisles commonly used as material transporting route should be maintained clear and in proper condition for unhampered flow of material.

5. The handling of tools and supplies to some machines and equipment may be as fully important as the handling of the materials themselves. These operations should be studied to make certain that safe and efficient means are provided in carrying on these supplementary tasks.

6. Special attention should be given to equipment necessary for inspectors' use.

By paying close attention to a few important fundamentals, the manual material handling problem can be brought under control. Here are a few fundamentals:

Lifting Correctly

This is an old story and has been repeated time and time again; however, millions of accidents are piling up each year because of incorrect lifting. Employees should be taught to keep their backs straight and lift with their leg muscles. Any object that cannot be handled in this manner should be moved by two or more men.

Hand Protection

Proper type gloves should be used for the material being handled. For lumber, and other material presenting a splinter hazard, gloves with specially reinforced palms should be used.

Foot Protection

When the material being handled might cause toe and foot injury, safety shoes with a steel box toe cap should be used.

General Handling Instructions

Employees should be sure that their hands and the objects being moved are free of oil, grease, slivers, nails and sharp wires. The grip should not be changed while the object is being lifted. If two or more persons are lifting or carrying together, one man should be designated as leader to call the signals. The members of the team should walk in step and lower or lift in unison.

Great advantages have been made during recent years to reduce the manual labor needed while handling materials. Some types of the widely used mechanical installations include: Hoisting equipment such as cranes, winches, air hoists and elevators; Bulk conveyors such as skip hoists, screw and continuous bucket conveyors, tubes and chutes; Industrial trucks either of the gas engine type or storage battery type; tractors and portable stackers; Package handling equipment such as gravity rolls, platform conveyors, monorail system; Piping systems to replace drums and tanks.

The following example is an illustration of what can be done in industry where mechanical handling equipment is used.

Method of Handling Freight

In operating a freight terminal handling all types of commodities, one of the principal duties is the loading and unloading of freight cars. These shipments are variable, but consist principally of boxed and bulky articles, wool and cotton in bales and crated machinery. Movement of merchandise was effected by men with dollies and push trucks, or simply by hand. As a result, the accident record ran high with

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Table 1.

12 men @ $50.00 average weekly wage	$31,200.00
Clinical Expense	413.00
Compensation cost on above @ 32 per cent charge	1,441.00
Cargo claims (defense and settlement)	3,700.00
Total	$36,754.00
Average time for unloading one freight car	8 hours
Yearly total of cars	260 cars
Cost per car (average) for handling freight	$141.40*

*This figure is based on above expenses and not to be considered a complete operating expense.

Table 2.

4 men @ 70 average (operators)	$14,560.00
4 men @ 60 average	12,480.00
4 men @ 50 average (3 mos.)	2,600.00
Total wages	$29,640.00
Fork lift operating, maintenance and depreciation	2,100.00
Clinical expense	76.00
Compensation cost on wages @ 23 per cent charge	1,275.00
Cargo claims (defense and settlement) including a fire loss	2,370.00
	$35,461.00
Average time in unloading one freight car	6.5 hours
Yearly total of cars	325 cars
Cost per car (average) for handling freight	$105.85*

*This figure is based on preceding expenses and is not to be considered a complete operating expense.

bruised and crushed members, cuts, strains and two hernia cases. The costs of operating for one year prior to new equipment are shown in Table 1.

On the recommendation of our safety engineers two fork lifts were purchased and four of the men trained in their use. It was hoped that the use of this equipment would avoid cases, such as, the two hernias and promote more careful handling of freight. The cost of the new equipment at $2,200 each was $4,400.

Following the introduction of this new equipment, the safety record showed marked improvement and after three months, four of the men were transferred to other duties. Although the amount of freight increased rapidly during the following year, the reduced crew passed their expected quota of unloadings. The costs of operating the year following the new equipment are seen in Table 2.

The results gave an improved safety record with less damage, and although the costs shown on freight unloadings are only expenses relative to the men moving cargo, in themselves they showed a reduction in costs to the management of 25.2%.

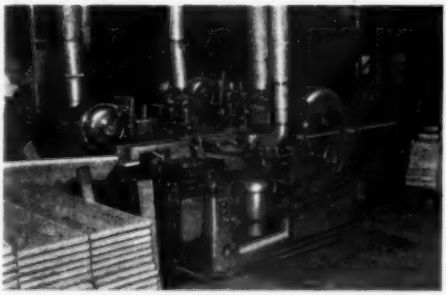
Of course, there are a thousand rules and many examples. The main thing to remember is that even with all these rules basic individual plant problems should be studied when a material handling survey is being made. In all of our accident investigations we find that most of the difficulties arise in this field because employees have not been properly instructed.

Here is a story that I have frequently come across in my discussion with material handling engineers. When people in charge of production have installed new mechanical material handling equipment they run into trouble with the company safety engineer. The safety engineer often says that the equipment is not safe; although many times he will not give specific reasons for making such a statement.

I don't want to condemn this attitude too much because if there is any doubt about the safety of equipment, extreme caution should be taken.

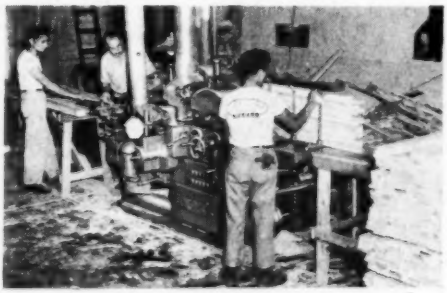
TEMPLETON, MASS.

A production operation in a furniture and cabinet manufacturing plant is shown here. The machine does a wide variety of work.



BEAVER DAM, KY.

One of the specialized products in this southern plant is oak stair treads, here shown being finished in substantial volume.



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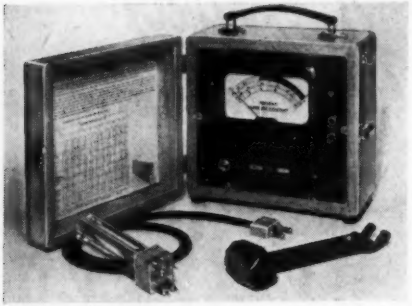

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However, I do feel that sometimes handling material programs are delayed because safety engineers do not know enough about the procedure in question. I also believe that safety is sometimes disregarded by material handling engineers.

It all boils down to this. Material handling engineers must recognize the importance of safety. No handling program, regardless of what you save in money, is worth anything if it is not safe. Material handling engineers must know something about accident prevention. If they don't, they must ask the help of the safety engineer.

On the other hand, safety engineers must not be afraid of new equipment. They must get the facts. They must know something of material handling. Because equipment can lift tremendous loads to great heights is no reason in itself to say that the equipment is not safe.

Material handling engineering and safety engineering must work together. They will make a fine team by pooling their knowledge. Great things can be accomplished.

The End

SAFE PRACTICE

There are safe practices for every handling job.

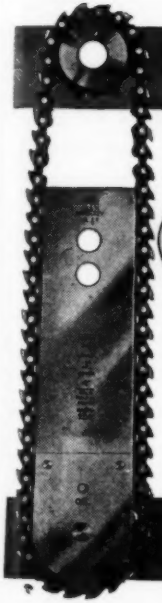
It may mean using cranes, trucks, dollies, wheelbarrows, stock trays, liquid containers, ropes, chains, and other types of equipment.

It may mean wearing safety shoes, gloves or other protective clothing.

It may mean using the proper methods of moving certain objects, keeping within proper areas for moving about, or putting things in proper places.

It may mean gripping, holding, standing, or walking in a manner to avoid hand pinches and fumbles, stumbling or being struck.

It may mean piling material by methods that will prevent slipping, rolling, toppling, or collapsing.



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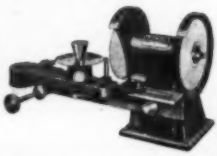

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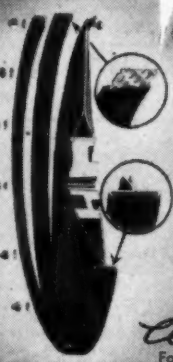

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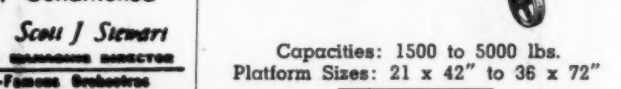
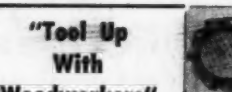


DOES YOUR MORTISE EQUIPMENT MAKE A CLEAN, STRAIGHT CUT LIKE THIS?



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Fits any chain mortising machine. Renold mortise gear is made by specialists in the manufacture of transmission chains. It embodies the best design, finest skill in workmanship and these factors, combined with the specially selected steels employed, insure users of Renold gear the maximum result. Write for prices, advising kind of machine you have and size of mortise you wish to cut.

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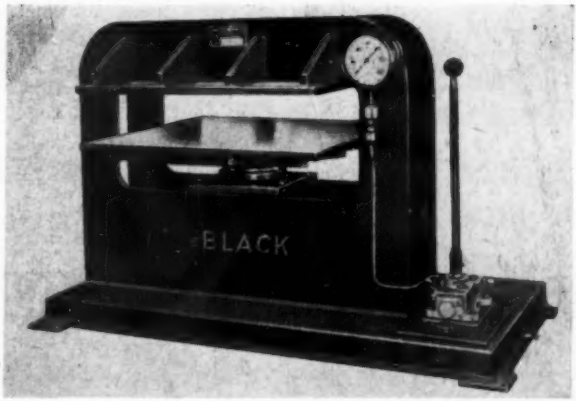


BLACKS INTRODUCE NEW HAND OPERATED HYDRAULIC PRESS

Illustrated above is a new manually operated hydraulic press for laboratory and light production work being introduced by the Black Brothers Co., Inc., Mendota, Illinois. Modern steel plate frame construction is used in these presses, with the upper platen being securely welded to the top rails. The assembly consisting of the cylinder, piston, and lower platen is supported directly by the lower frame rails. Both platens are heavy plate steel, rigidly reinforced and accurately planed on the pressure surface. The cylinder is accurately machined from solid steel, and will permit pressure to be maintained for extended periods of time.

The new Black presses may be had in a wide variety of sizes and with many modifications. Variations may be had in the length and width of the platen, the vertical opening of daylight, the length of the stroke, the total pressure applied, and other details. Write The Black Brothers Co., Inc., Dept. WD, Mendota, Illinois for more information.

TIMESAVER SHAPESANDER

There is a new Timesaver, the Shapesander, a power feed single drum

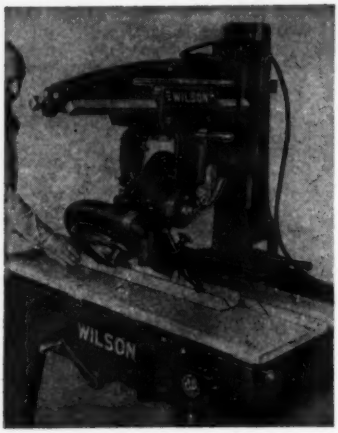
sander for production sanding of curved, serpentine and contoured wood stock.

The use of the Shapesander is said to eliminate tedious and costly hand sanding. This saves the operator labor and time while increasing sanding production. The power feed and the sanding drum are powered by separate motors with an overload switch for extra protection. A quality spiral flute bristle brush synchronized to the power feed keeps it clean and in good operating condition.

Sanding dust is collected in a large bin under the drum that has an exhaust outlet at the base of the machine for fast disposal. The power feed can be easily and quickly adjusted to accept stock up to 2" thick and 12" wide.

The sanding drum will accommodate as many pieces as the operator can fit across the face of the drum.

For further information write to Timesavers, Inc., Dept. WD, 549 W. Washington St., Chicago 6, Ill.



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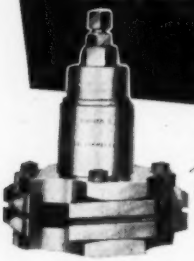

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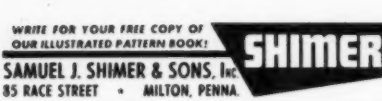

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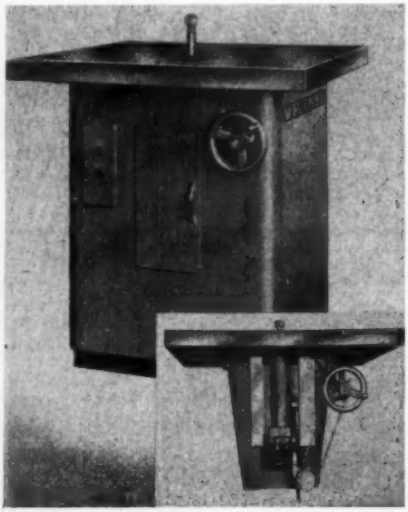
WHITNEY ANNOUNCES SINGLE SPINDLE SHAPER

The new Whitney 510 shaper is designed for high spindle speeds, accuracy and high production shaping of many parts from brush and cutlery handles to form shaping of a wide variety of furniture parts such as chair seats, arms, small table tops, dresser tops, school desk tops, etc. It is a precision built shaper with spindle speed of 10,500 r.p.m. Its 2 h.p. motor is mounted within the shaper base on a hinge mount which provides for adjustment of belt tension adjustment. The spindle is driven by means of a thin flat endless belt and, we are told, no frequency changer is required.

A unique feature, the manufacturer states, is that the spindle housing yoke is mounted in a heavy cast iron bracket which is bolted to the underside of the heavily ribbed table. The table is rigidly supported on a streamlined, fabricated steel base. The manufacturer says that this type of construction makes for simplified design, smooth, vibrationless operation of the spindle and permits many economies in manufacture.

Complete information is available from Dept. WD, B. D. Whitney & Son, Inc., Winchendon, Mass.



NEW TOGGLE CLAMP

A new, compact, quick-acting toggle clamp for production work-holding fixture is announced by Detroit Stamping Company, manufacturers of the "De-Sta-Co" line of toggle clamps.

Known as "De-Sta-Co" No. 235-U, the new clamp features holding pressures up to 650 pounds. Clamping bar moves into a fully-retracted vertical position when the clamp is opened, allowing maximum clearance for speedy

insertion and removal of work. Precision-stamped from heavy-gauge steel, No. 235-U features a handle designed with full hand clearance for easy, safe operation and a rubber tipped bolt assembly adjustable both horizontally and to work height.

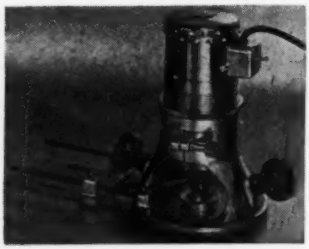
Bearing holes are reamed, pivot pins long-wearing stainless steel. Dimensions: closed, 2¾" high by 10¼" long; open height, 6¼". Weight, 1¼ lbs.

Descriptive bulletin available from Detroit Stamping Company, 312 Midland Avenue, Detroit 3, Mich.

BOICE-CRANE ADDS NEW MODELS

New models of band saws mounted on individual open type floor stands have just been developed by Boice-Crane Company, Toledo. The addition enlarges to 12 the total number of 14-inch band saws in the Boice-Crane line.

Free descriptive literature will be sent to anyone addressing Boice-Crane Company, 931 Central Avenue, Toledo 6, Ohio.



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Foot powered model; $166.75; cuts 2¼" wide. Leaves hands free for aligning work.

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Fig. A

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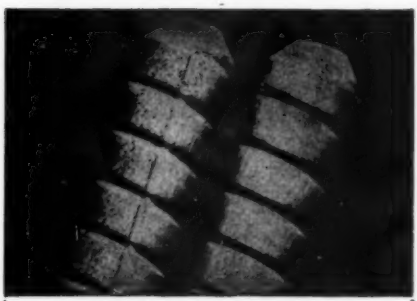

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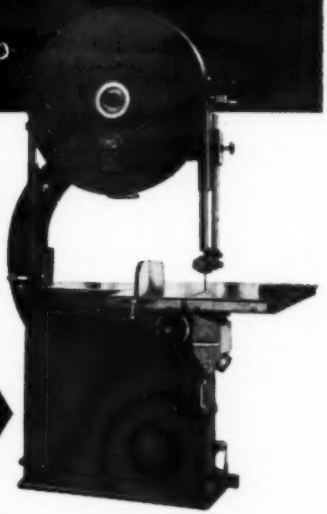

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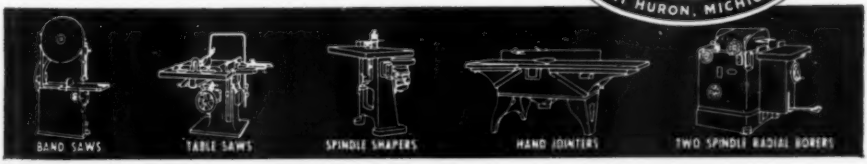

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Router, Defiance, 2 spindle bb. dmd.
Routers, Carter, floor type Hvy., duty, electric
Sander, Berlin, 31" 3 drum, roll feed bd.
Sander, Mattison No. 134, pb. bd.
Sander, Mattison No. 138—Belt, hand, pb. & motor
Sander, McKnight, Sgl. Drum bb—v-belt drive
Sander, New Jefferson, hand block, bb. dmd.
Sanders, Sheboygan 49" 3 drum endless bed, bb., dmd.
Sander, Smith 49" 3 drum endless bed, bd. with motors
Sander, Vonnegut, pneumatic bb. dmd.
Sanders, F & E 60" 3 drum roll feed, dmd.
Sanders, Nash No. 25—10 spdle. dmd.
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Saws, Powers, gang rip. pb. v-belt & motor
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Jointer, F&E, No. 61, 16 in. rd. head, $185
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Berlin No. 89 B.B. Flooring Machine
American No. 80 Ro Hd Double Surfacer
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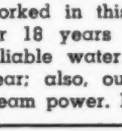

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Andrew 72" Horizontal, Four or more Spindles, M.D.
Andrew 60" Vertical 8 spindles, power feed
Valley-City 2-spindle Radial Horiz. m.d.
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CARVERS:
Porter Ballbearing pedestal type, Motor Driven

CLAMPS:
Bell Air Operated Cabinet Clamps, plates 24"x48".
Taylor 6½ ft. 40-section Style No. 80, Power Driven
Taylor 20 section, 6½' cap. four clamps per section

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Dodds 10, 20 Spindle, spiral gears, M.D.

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Hawker No. 5 motor driven, 5" capacity.

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General Electric 5-10-15-25-33 KW, D.M.D.

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Jenkins No. 3-C Cont. Chain-feed, B.B., Belted M.D.

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Greenlee No. 228 Hollow Chisel Single Spindle, M.D.
Wysong & Miles No. 284 Vertical, direct motor

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Yates 4" No. C-3-A Four-Side Ballbearing

PLANERS:
American 24" No. 1½ Single, ballbearing, motor
American 36" No. 666 Double, B.B. M.D.
Fay & Egan 24" No. 156 Single, ballbearing, motor
36" Whitney No. 29 Single Planer, Motor Driven
Buss 30-in. Mod. No. 88 Double B.B., D.M.D.
Whitney 40" No. 33 Heavy Duty Dble Surf. B.B., M.D.

ROUTERS:
Onsrud W-265 Ballbearing, motor driven.
Porter No. 500 Electric, B.B., 7½ H.P. Motor

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Curtis Mod. 8-V Semi-Auto. Panel Belt Sander, 10 ft.
Mattison No. 137 Hand Block Moulding, M.D.
Wysong & Miles No. 270 Horiz. Osc. Edge, M.D.
Yates-American No. 427 Hand Block, Motor Driven.
Yates-American No. 430 Hand Block, self-cont. Mtr.
Mattison No. 115 Variety, with 5 HP built-in motor.
Peerless 9" Vertical Ballbearing, Motor Driven.

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Solem 43" No. 370 Two Drum Endless Bed, M.D.
American-Columbia 36" No. 2 Roll Fd., Moor Dr.
Solem 73" No. 430 Triple Drum Endless Bed, b.b., m.d.
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Yates (Berlin) Six-Drum, 31" capacity, m.d.

MISCELLANEOUS SANDERS:
Nash No. 65, 56" Automatic Turning Sander, 4 spdls.
Nash No. 25, 48-in. Auto. Turn., 10 spdl., B.B., M.D.
Nash No. 25, 72-in. Auto. Turn., 10 spdl., B.B., M.D.
Ekstrom, Carlson No. 18 Pneu. Drum Sander, M.D.
Oliver 15" Single Disc Sander, ½ HP motor.
Vonnegut "SEM" Double End Spindle Sander, M.D.

BAND SAWS:
Porter 18" No. 88, Ballbearing, Motor Driven
American 36" No. B-36 ballbearing, motor driven
Tannewitz 42-in. Type RHE Band Saw, B.B., M.D.
Tannewitz 42-in. Type "R" Band Saw, B.B., D.M.D.
Jones-Superior 42-in. No. 55 Band Saw, V-belt M.D.
Crescent 40-in. tilting frame (angle) Band Saw w/mtr.

CUT-OFF SAWS:
Bell No. 12 Double Mitre and Cutoff, b.b., M.D.
DeWalt Model "GS" Radial Arm Saw, ½ H.P.
DeWalt Radial Arm, 3 HP and 7½ HP motor.
Heston & Anderson Bench Type No. 5, Motor Driven Conveyor Table
Oliver No. 94 Straight Line, Motor Driven
Porter 5' Ceiling Type Swing, motor on arbor.
Yates-American Model "G-44" Straight Line, ball-bearing, m.d.
Yates-Amer. G-35 swg. cut-off, 5 hp b.b. mtr-on-arbor
Fay & Egan 50-A swg. Cut-off, 5 hp b.b. m-on-arbor
Jones-Superior Ceiling Swing, Motor-on-Arbor

RIP SAWS:
Mattison No. 205 Chain Feed, b.b. M.D. (2)
Smith No. 335-A Self-Feed, V-belt motor drive
Diehl No. 75 Chain Feed, B.B. 2 Motors
Yates-American No. G-67 Chain Fd. Straight Line Rip and Edging Saw, B.B., M.D.
Yates G-2 Chain Feed, 10 HP motor-on-arbor.

VARIETY SAWS:
Moak No. 16-A Tilt Table, motor-on-arbor
Crescent No. 9 Tilt Table, motor-on-arbor
Tannewitz Type "H" Double Arbor, belt drive
Sidney (Famous) Tilting Table, Motor-on-arbor.
Yates-American No. 1 Tilt Table, B.B., M. on A.
Darra-James and Boice-Crane Tilting Arbor

SHAPERS:
Porter No. 103 Single Spindle, ballbearing, M.D.
Porter No. 201 Dbl. Spdle. B.B. with 2 Vert. Mtrs.
Whitney No. 351 Double Spindle, ballbearing, M.D.
Whitney No. 250 Double Spindle, 7½ HP Motors.
Greenlee No. 180 Dbl. Spdl. B.B. Motors on Spdles.
Whitney No. 134, 156, Dble. Spdle. B.B., Motors.
Advance No. 122 Double Spindle. Ballbearing. M.D.
Amer. No. 30 Dble. Spdle., B.B., 5 HP mtrs. at rear
Smith Double Spindle. Ballbearing, Motors-on-spindles.
Fay & Egan No. 452 Dble. Spdle., b.b. M.D.
Onsrud W-200 Single Spdle., High Spd. B.B., M.D.

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Smith Single End, Copes, Cut-off Saw, Motor Driven
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Merritt 84"x54" Veneer Redrier, 8-10-12 plates, M.D.
Merritt 100"x52" Redrier, 10 plates, M.D.
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Food Machinery Co. Type CBM 20-track Cheese Box Nailer m.d.
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BAND RIP AND RESAWS
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McDonough 62" Vertical Band Resaw

BORING MACHINES
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Greenlee No. 363 6-spindle universal M.D.
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Greenlee No. 356 single-spdle. vert., d.m.d.
Greenlee 36-in. No. 369 vert. gang, 8-spd., m.d.
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Sturtevant No. 25-30-35 Mill Exhausters

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Black Bros. No. 2 2D 26-in. dbl. resin sprdr.
Greenlee No. 599 frame and furniture clamp

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Hanchett band saw brazer.
Rogers 38" cup wheel auto. knife grinder
Hanchett No. 608 lap gr. b.d. max. cap. 6" wide
Black Diamond No. 5 circular saw filer, M.D.
Covel-Hanchett No. 325 thin knife grinder

JIG SAWS
Smith—Colladay—Jones Superior M.D.

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Porter, American, Oliver, Sidney, Fay & Egan from 8" to 30" wide—several have feeding attachments—tell us what you need
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Mattison-Greenlee D-616 continuous-feed.

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Mattison No. 55-F 30-in. auto. shaping, M.D.
Whitney 50-in. back knife gage lathe
Mattison No. 214 copying lathe
50" Mattison hexagon T-slot heads with carriers and knives 2-11/16" bore

MORTISERS
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New Britain Nos. 2 and 7 chain, motor-drive

MOULDERS
Rowley-Hermance 6-in., coupled motor drive.
Newman 4"x4" all Electric
American 10" Electric with freq. chgr.
Yates No. C-89 10"x4" all Electric
Smith 8-in. drop bed, V-belt, m.d.

PLANERS
Berlin No. 177 30"x12" Double Belt dr.
Yates No. 156 20-9n. rd. hd., m.d.
Porter No. 401 24" round head. BB D.M.D.
Whitney 44-in. single, motor-drive
Oliver No. 61, 24-in. single Motor Dr.
Buss 26", 30" & 36", single B.B. M.D.

ROUTERS
Carter Type TR—Porter No. 600—Ekstrom-Carlson No. 24—Onsrud Type A4RR 2-spindle radial—M.D.

SHAPERS
Oliver No. 285, single BB M.D.
Whitney No. 182, sgl., D. M.D., 56x40" table
Whitney No. 134 double-spindle, dir. M.D.
Amer. No. 20 dbl.-spdl. dir. M.D. freq. changer
Sidney double b-b short belted M.D.
Advance double-spindle, ball-bearing, mtr. dr.
American dbl. spindle, belted m.d.

SANDERS
Porter-Cable 15-in. disc, motor-drive
Fay & Egan 30" 3-drum roll-feed.
Yates No. 401 43" 3-drum roll feed.
Duplex moulding sander
Buss-2-spindle vertical, oscillating belt drive
Wysong & Miles No. 164 universal belt, m.d.
Yates No. 431, 43-in., 3-drum end-bed, m.d.
Yates No. 421, 49-in. 6-drum with motors

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Tannewitz tilt-table, motor on arbor.
Crescent No. 10 roller tilt-table, direct m.d.

CUT-OFF SAWS
Jenkins No. 97, 108"x48" Double End chain feed with copes, direct M.D.
Egan cabinet type, double, belt-drive
Multiplex No. 40A radial arm, 1½ h.p.
Fay & Egan No. 306 butting saw
Greenlee No. 451 auto. cut-off and dado
Buss double cabinet type, motor-drive
Fay & Egan No. 281 Chain-Feed, dbl., B.D., max. 6'6"
Porter 43 SLA straight line D.M.D.

RIP SAWS
Yates No. 255 Self feed with motor
Yates G77 chain-feed, D.M.D.
Smith No. 335A self-feed, belt or motor-drive.
Yates G-2 chain-feed; motor-drive
Mattison No. 207 chain-feed, motor-drive

TENONERS
Greenlee No. 534, Single end wth cut-off, no copes, dir. m.d.
Smith No. 225CE single-end with copes.
Houston single-end with copes, rolling table
Wilkin-Challener No. 70 90x48 in. double end, electric

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Greenlee No. 356 motor-driven single-spindle vertical borer.
Single-spindle Fay & Egan No. 1 vertical borer.
Multiple-spindle vertical Fay & Egan borer.
Andrew vertical gang borer.
Andrews Horiz. Multi. Borer mtr. dr. pwr. fd.
Greenlee No. 386 vertical gang borer.
Greenlee No. 369 vertical gang borer.
Greenlee 369 Vertical Multi. Borer pwr. fd. b.b.
American No. 2½ single-spindle horizontal boring machine.

CLAMPS

Handy No. 103 frame clamp.
Taylor revolving clamp carrier, 40-sections.
High Point drawer clamp.
New Union Air Operated Revolving Case Clamp
Handy Revolving Case Clamp

DOVETAILERS

One 12-spindle Dodds dovetailer.
Pair 12-spindle Dodds dovetailers: Each equipped with Teague automatic feed for doing fronts, backs and sides. With motors.
Pair 25-spindle Dodds dovetailers with Teague automatic feed.
Wysong & Miles No. 290 Auto. Dovetailer & Lock Corner Machine

FANS

48" double ball bearing shaving exhaust fan
60-in. double ball-bearing shaving exhaust fan with 25-h.p. motor.

GLUE SPREADERS

New Union 54-in. No. 31 double rubber roll resin glue spreader.
Practically new Black Bros. 12-in. motor-dr. edge glue spreader.
Francis 72-in. and 84-in. No. 290 plate glue spreader.
New Union conveyorized edge glue spreader for resin glue.

GRINDING ROOM EQUIPMENT

American No. 9 automatic knife grinder.

JOINTERS

Yates-American 12-in. No. 1 direct motor-driven ball-bearing round-head
Diehl No. 60 direct motor-driven glue jointer.
Yates No. 213 direct motor-driven glue jointer.

LATHES

Yates 42-in. No. 74 automatic lathe ball-bearing.
Mattison 42-in. No. 57-D with motor.

MORTISERS

Wysong & Miles No. 268 Multiple Spdle Mortiser
Wysong & Miles No. 286 hinge seat mortiser.
Greenlee single-spindle vertical mortiser.

MOULDERS

Vonnegut 6" Electric Moulder
10" Yates-American C99 Electric Moulder
Yates-American 4" C69 Electric Moulder
4" Vonnegut Electric Moulder

SINGLE PLANERS

New Crescent P-24 direct motor-drive round-head with grinder.
Oliver Strait-o-plane.
30" Buss Direct Motor Drive ball-bearing single Planer with grinder
30" American No. 444
Used Crescent P-24 Direct Motor Driven

DOUBLE PLANERS

Yates 30-in. No. 177 double direct motor-driven planer.
Yates-American 30-in. B-24 double direct motor-driven fast-feed heavy-duty planer.
Whitney 40" No. 24 Direct Motor Driven B.B.

BAND SAWS

36" J. A. Fay & Co. Band Scroll Saw

SANDERS

Yates-American 61-in. S-23 direct motor driven ball-bearing roll feed.
Yates-American 43-in. No. 433 direct motor-driven endless-bed.
Yates-American 43-in. No. 431 3-drum direct m.d. endess-bed.
Mattison No. 124 automatic stroke sander.
American No. 7 oscillating spindle sander.
Fay & Egan direct motor-driven ball-bearing endless-bed.
Pearson waterfall sander.
Nash No. 10 automatic turning sander.
McKnight No. 44 Chair Back Drum Sanders

RESAWS

42-in. J. A. Fay & Egan No. 58 combination band scroll and resaw.
American No. 4 Band Resaw
Yates-American 44" No. 283 Roller Bearing

CUT-OFF SAWS

Porter C-43 straight-line direct motor-drive.
Newman swing cut-off saw.
Beach ball-bearing roller table double cut-off saw.
Yates-American No. 51 Direct Mtr. Dr. Swing Cut-Off Saw
Yates-American No. 2 direct motor-driven roller table double cut-off saw.

RIP SAWS

Mattison No. 207 direct motor-driven ball-bearing glue joint rip saw.
Yates-American direct motor-driven ball-bearing chain feed rip saw.
Fay & Egan No. 504 direct motor-driven ball-bearing self-feed rip saw.
American No. 15 ball-bearing chain-feed rip saw.
New Mereen-Johnson No. 441 gang rip saw.
Diehl No. 55, direct motor drive, b.b., Glue Joint Ripsaw

VARIETY SAWS

Crescent direct motor-drive b.b. tilting table.
Beach direct motor-drive ball-bearing tilting-table No. 5A.
Yates F-2 Direct Mtr. Dr. ball bearing

SHAPERS

Whitney double-spindle ball-bearing, built-in mtrs.
New Crescent Type S-2 single-spindle with 2-h.p. motor.
Whitney No. 393 automatic single-spindle shaper.
Buss Dble. Spdle. b.b. w/vert. mtrs. belt. to spdls.

TENONERS

Jenkins No. 95 electric double-end tenoner.
Greenlee 545 double-end tenoner.
Wilkin-Challoner No. 70 double-end tenoner.
American single-end tenoner.
Fay & Egan Single End Direct Mtr. Dr b.b.

VENEER MACHINERY

76" Francis Hydraulic Veneer Clipper
Dennis veneer taping machine, motor-driven, variable-feed.
Merritt 12-plate veneer re-drier, motor-driven, size 53x100-in.
Francis 84x36 Hydraulic Veneer Press

MISCELLANEOUS

Gardner-Rix 6x6-in. twin cylinder air compressor with 15-h.p. motor.
Mitts & Merrill hog with 50-h.p. motor, practically new.
Porter Pedestal Type Spdle. Carver, b.b. with self-contained motor
G.E. 15 KW Motor Driven Frequency Changer

SUTTON WOODWORKING MACHINE CO.

Sedgefield Inn **Phone 2-4186** **Greensboro, N. C.**

√ CHECK √
MONICAL'S RE-BUILT LISTINGS FIRST
FOR THE LATEST (AND BEST) IN WOODWORKING MACHINERY

★

PARTIAL LIST

BORERS
Wysong & Miles single vertical.
No. 95 Andrew horizontal.
No. 371 Greenlee multiple-spindle 6-ft. vertical.

CLAMPS
Handy revolving carrier.
No. 80 Taylor 10-ft., 12-section wheel type carrier.
Billstrom 6-ft. 29-section carrier.
Handy frame clamp Nos. 195 and 197.

DOVETAILER
Dodds 15 and 20-spindle.

JOINTERS
Hand jointers, 12 to 24-in.
Chain-feed, Meyers, Fay & Egan, Diehl, and Jenkins.
Jenkins saw type veneer jointers, ball-bearing, 6 and 8-ft.

LATHES
No. 600 Imperial ball-bearing, direct m-dr. autom. turning.
No. 57-D Mattison ball-bearing, motor-driven autom. turning.

MOULDERS
Vonnegut 6 and 12-in. electric, ball-bearing.
No. C-89 Yates 10-in. ball-bearing, direct motor-drive.
American 4-in. babbitt-bearing, belt-dr.
Fay & Egan 7-in. plain bearing, 4-head.
Hermance 16-in. 4-head with 20-h.p. mtr.
Woods 8-in. plain bearing, belt-drive.

PLANERS
No. 177 Yates 30-in. double roughing.
Buss 30, 36 and 44-in. single; 30-in. dble.
Whitney 30 & 36-in. sgle.; 30-in. dble.
Buss 4-L Model H.

ROUTERS
No. W-240 Onsrud two-speed with S-175 automatic shaping attachment.
No. W-180 Onsrud.

SANDERS
No. 10 Nash 6-spindle, No. 25 10-spindle
No. 171 Wysong & Miles moulding.
53-in. American 3-drum roll-feed.
Yates 3-drum endless-bed, 43 and 49-in.
Smith No. 401, 3-drum endless-bed.

SAWS
Clement 54-in. band resaw.
Bell No. 12.
Diehl No. 55 chain-feed rip saw.
6 and 7-ft. Buss and Hall & Brown hand-feed double cut-off.
Yates No. 312, 44-in. band rip, chain-fd.
No. 207 Mattison chain-feed rip.
No. 40 Multiplex radial arm.
Tannewitz double miter.
Wilkin-Challoner double cut-off.

SHAPERS
Buss and Whitney double-spindle.
No. 155 Porter double-end serpentine (horizontal).
Onsrud W-124 automatic.

TENONERS
Fay & Egan single end.
Eaglesfield saw type ball-bearing.
Jenkins No. 95 all-electric, ball-bearing, double-end.

MISCELLANEOUS
No. 928 Covel-Hanchett automatic circular saw sharpener.
No. 300 Francis flat plate edge gluer (new).
6, 8 and 12-plate Merritt redriers.
Nos. 7 and 8 Bell dowel drivers and gluers, motor-drive.
Francis 30x72-in. hydraulic veneer press
Hooper chain-feed 2-color printer, 23x42.
Salstrom 24-spindle multiple carver.

SPECIALS FOR THIS MONTH
Rebuilt Bell No. 12C double mitre and cut-off saw.
Rebuilt Whitney 36-in. double ball-bearing planer

MONICAL MACHINERY COMPANY
260 WEST LEONARD **GRAND RAPIDS, MICHIGAN**

FADER'S FILE OF...

REBUILT MACHINERY — QUALITY — VALUE

BAND SAWS
Superior 36", steel spoked, motor driven
Superior 42", ballbearing, motor driven
American 36", ballbearing, motor driven

BORERS
Andrews 60" 6-Spindle, Horizontal, Direct Motor Driven Power Feed.
Greenlee No. 369, 5' Vert. Multi-Spdl., D.M.D.
Greenlee No. 369, 4' Vert. Multi-Spdl., M.D.
Valley City, 2-spdl., adj. radial, motor driven
American 2-spdl., adj., radial, motor driven
Bell 3-spdl., adj., horizontal, M.D. Power Feed
Superior 2 Spindle Adjustable Radial Ballbearing, direct motor driven
Wysong & Miles No. 283B, Sgl. Spdl. Vert., B.B. D.M.D. (Like New)

CARVING MACHINES
Balstrom 24 Spindle, Direct motor driven, Ballbearing.

CLAMPS—ASSEMBLY
Bell Chair Assembly, Air Operated (like new)
Bell 4-way Hi-Jaw, Air Operated.
Bell 4-way Frame & Chair Back, Air Operated.
Bell No. 95, Revolving Case Clamp, Air Operated.
Handy No. 227, 4-way Box Clamp, foot operated.
Handy Mitre Clamp, 20"x26" maximum

CLAMP CARRIERS
Handy 18-sec., 5 ft. wide, 38" clamps per sec.

DOVETAILERS
Dodds 12 Spindle, motor driven, spiral gears
Dodds 25 Spindle, motor driven, spiral gears.

DOWEL MACHINERY
Bell No. 4-A capacity ¼"-2", M.D., B.B.
Hawker No. 2, capacity ¼"-2", M.D., B.B.
Nash No. 4 Dowel Rod Sander, motor driven

JOINTERS
Fay & Egan No. 217, Continuous Chain Feed
Jenkins No. 3CD, Continuous Chain Feed, B.B., D.M.D.
Superior 16", Round Head, B.B., M.D.
American 12", Round Head, motor driven
Superior 12", Round Head, motor driven

JIG SAWS
American, self-contained
Oliver No. 173 Self-contained, D.M.D.
Superior, Self-contained, motor driven

MORTISERS
Greenlee No. 228 Vert., Hollow Chisel, M.D.

MOULDERS
Hermance No. 50 10" 4-side, motor driven
American No. 1, 4", 4-Side, Motor Driven
American No. 1-6" 4-side motor driven
Mattison No. 229, 10", 4-side, D.M.D., B.B., Elec. Houston, 10", 4-side

PLANERS
Whitney No. 24, 30" Double Cabinet, B.B. D.M.D.
Superior 28" Single, Motor Driven
Buss No. 4, 30", sgl. cabinet, D.M.D., B.B.
L. Power 24"x 9" Planer-Matcher, motor driven
Yates No. 156, 26", single, motor driven
American No. 112, 30" single, motor driven

ROUTERS
Porter No. 502, 2-spdl., B.B., D.M.D.

SANDERS
43" H.B. Smith, 3-Drum Endless Bed, D.M.D.
Indiana No. 7 Hand Block Belt B.B., d. m. d.
American 31", 2-drum, Roll Feed, M.D.
Curtis 8' Automatic Stroke, motor driven
American No. 2, 24" Disc and Oscillating Spdl.
American No. 5 Drum Sander, D.M.D.
Nash No. 4 Round Stock and Dowel Sander

SHAPERS
Onsrud W12S 72" Automatic, multiple stations, B.B. direct motor driven, with frequency changer
Porter, Sgl. Spdl., high speed, B.B., M.D.

SAWS—CUT-OFF
Bell No. 12 Double Mitre and Cut-Off, Direct Motor Driven, Ballbearing
Buss Double End, Motor Driven
Racine Floor Type—motor driven
Fay & Egan Double End, Motor Driven.

SAWS—RIP
American No. 15 Chain Feed, motor driven
American No. 40 Chain Feed, Ballbearing, D.M.D.
Fay & Egan No. 264 Self Feed, D.M.D.
Defiance No. 21-D Chain Feed—motor driven
Mattison No. 207 Chain Feed, Ballbearing, D.M.D.
Yates No. G-2, Chain Feed, Direct Motor Driven, Ballbearing

SAWS—VARIETY
Dodds Tilting Table, Motor Driven
Pettingell, Tilt Arbor, Roller Table, M.D.
Tannewitz, Tilting Table, motor driven

TENONERS
American, Single End, Tenon Heads, Motor Driven.
McKnight No. 71C Chair Back Tenoner, M.D
Towsley Single End, Tenon heads, lower cope, cut off saw, motor driven

VENEER MACHINERY
Dennis Taping Machine, motor driven
Dennis Continuous Feed Veneer Jointer, mtr. driven
Jenkins-Falls Veneer Jointer, B.B., motor driven

MISCELLANEOUS
Autonailer, Floor Type, Direct Motor Driven, Ballbearing.
Bell No. 13 Dovetail Gluer.
Black Bros. 12" Edge Glue Spreader, motor driven.
Zoller Power Mitre Chopper, motor driven
Fay & Egan No. 253, Automatic Knife Grinder, 30"
Sturtevant 36" B.B. Blower M.D. B.D.

FADER REBUILT MACHINERY

FADER WOODWORKING EQUIPMENT QUALITY

A. L. FADER & COMPANY
605 W. Washington Blvd., Chicago 6, Ill., Phone STate 2-7634

• • SCOTCH PRICES • •

(Denotes Better Buys)

Band Resaw, twin, Mershon 54".
Borer, vert. dbl. column, Andrew No. 75, b.b., autom. 60", 10 h.p., 850 rpm, mtr.
Blower, Garden City 35", ball bearing.
Chucking machine, McKnight, foot-feed.
Clamp, 2-way, Handy No. 35.
Clamp, door, Am. 8'x4'.
Dowel Gluer and Driver, Bell No. 8, mtr.
Dowel Machine, Hawker No. 2, ball bearing
Factory Trucks, 4-wheel, Towsley 30"x60", 16" center wheels, 7" swivel wheels.
Glue Jointer, b.b., Yates-Am. No. 213, three mtrs.
Glue Jointer, ballb., Linderman, motors.
Hand-Hole machine, Woodworker's, ball bearing.
Jointer, 30", Clement, 2-kn. round head.
Jointer, Clement 30", Billstrom feeder.
Jointer, incline bed, Newman No. 60, 16", 5 h.p. motor on cylinder.
Lathe, autom., Imperial 31", 10 h.p., ballb.
Lock corner cutter, double end, B. & M., autom.
Mortiser, chain-saw, New Britain No. 3.
Moulder, 4-side, Hall & Brown, 8", mtr.
Moulder, 4-s., Smith, 6", ballb., mtr.
Nailer-Cleater, Doig, 60", open-back, 16-tr.
Nailer-Cleater, Morgan, 18-track, closed back.
Nailer, Doig No. 17, 12-track, closed back.
Nailer, Doig 4-track, 1 h.p.
Planers, sgl., 12", 16" and 20".
Planer & Matcher, 4-s. Fay 25"x6", sq. hds.
Planer & Matcher, F. & E. No. 415, 16"x6", 35 h.p. motor.
Planer & Matcher, 3-side, Indiana, 26"x6".
Planer, sgl.-end, eab., F.&E. No. 136, ballb., 24"x7", elec. grinder, 10 h.p., 3600 rpm motor on arbor.
Planer, dbl., Whitney No. 24, 30"x7", 4-kn. rd. hds., 15 and 10 h.p. coupled motors.
Resaw, Circular, Am. 30".
Ripsaw, self-feed, Sinker-Davis, ballb., mtr.
Ripsaw, st.-line, Indiana Type 6, two motors.
Ripsaw, chain-fd., Diehl No. 55, two motors.
Ripsaw, gang, Am. No. 22, Parquetry, motor.
Sander, 3-dr., Berlin 30", 4 motors.
Sander, 2-dr., Fay, 24", roll-feed.
Sander, 2-drum, e.b. Yates No. 413, 31", motors.
Sander, horiz., flat belt, B. & M., 20" b.b., mtr.
Saw, tilting table, Smith No. 341-A, revolving double arbor.
Shaper, autom., Onsrud WA-50-AS, nearly new.
Shaper, 2-spdl., Buss ballb., two 5 h.p. vert. belted motors.
Sticker, Williamsport, pl. & bor. attachment.
Sticker, one-side, American No. 1.
Strapping Machine, Doig.
Tenoner, sgl.-end, F.&E. No. 505, elec.
Veneer Press, Francis, 102"x25", 5-sects., 10 screws.
SUNDRY OTHER MACHINES IN STOCK.

• • EDGAR G. BICKLER • •

6444-52 Conway Ave., Mt. Washington, Cincinnati 30, Ohio

Telephone: BEechmont 7337

REBUILT AND USED MACHINES

BAND SAWS
American B-36, 36"
Oliver No. 116, 36", D.M.D.
Tannewtiz R-42", D.M.D.
Jones-Superior No. 155, 42", M.D.

BORERS
Root "GM" Vertical Single Sp.
Fay & Egan No. 312, 42" Vert. Multiple
American No. 1, 2-Spindle Horiz. Radial
Towsley 2-Sp. Horizontal Radial

CLAMPS
Lancaster No. 400B Air Frame Clamp
Lancaster No. 500 Air End Clamp

CLAMP CARRIERS
Taylor 6½", 30-section
Taylor 10", 60-Section, No. 80

DOVETAILER
Dodds 12-Spindle, spiral gear

FANS
Sturtevant 50" Single

GLUERS
Bell 72" Plate Edge Gluer
Francis 8" Gluing Machine

JOINTERS
6", 8", 12", 16", 20" sizes
Porter No. 300 CM 24" D.M.D.

LATHES
Mattison No. 57-D 42" Automatic
Reed 16" Turning Lathe, 16" swing

MORTISERS
New Britain No. 2 Chain Saw
Crescent Vert. M.D. Hollow Chisel
Wysong & Niles No. 181, 6-spindle
American No. 10 Sash Mortiser & Relisher

MOULDERS
Woods 2½" Electric No. 807M4
Hermance 6" 4-Side
American 6" & 3" 4-Side

PLANERS
24", 30" and 36" Single
Yates No. 156, 30" Single, M.D.
Whitney No. 24, 36" Double, D.M.D.

SANDERS
Yates No. 431, 43" Endless Bed, 3-Dr.
American No. 2, 43" Roll Feed, 3-Drum
Curtis No. 11 Semi-Auto. Belt Sander
Nash No. 65 Automatic Turning
Wysong & Miles 16" Disc Sander

SAWS - CUT OFF
Porter Floor Type, with Table
Y-A C-44 Floor Type, with Table

SAWS - CHAIN FEED
Mattison No. 205 Ball Berg., D.M.D.
American No. 15 Ball Berg. M.D.

SAWS - SELF FEED
American No. 1 Ball Berg., D.M.D.
Hermance No. 31 - Greenlee No. 426

SAW TABLES
Tannewtiz SJ Tilting Arbor
American No. 7½ Comb. & Dado
American Dbl. Revol. Arbor

SHAPERS
Hall & Brown No. 212 Single
American No. 1 Single Reversible
Advance Double Spindle, B.B.

TENONERS
Fay & Egan Single End
American & Smith Single End

VENEER MACHINERY
Diehl No. 89 Tapeless Splicer

B. M. ROOT CO., YORK, PA.

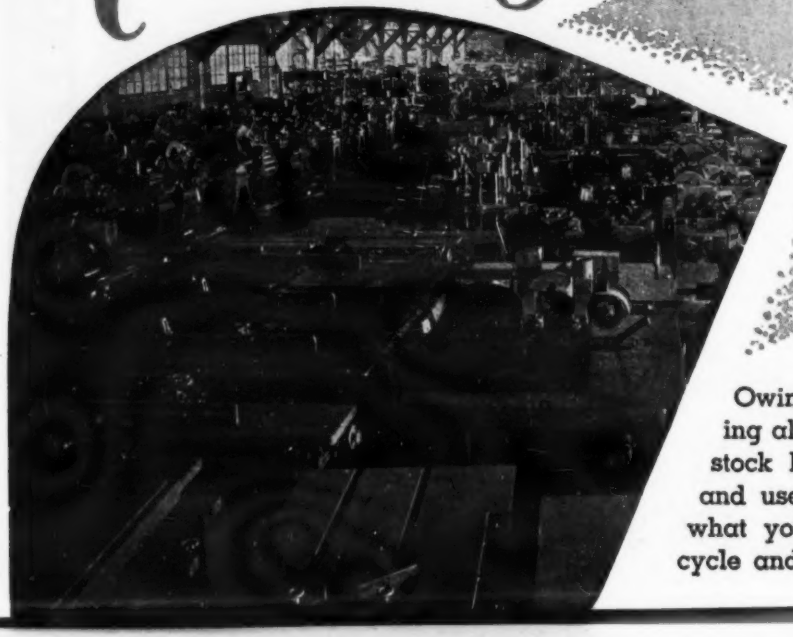
"If it's for Woodworking . . . We Have It"

BAND SAWS: Walker Turner 14" B. B. M.C.
Crescent 20" Ball Br. New
Crescent 26" Belt or M.D.
Lehman 30" Bab. Br. $125.00
Wright 30"
Crescent 32" Belt or M.D.
Oliver No. 118 36" Ball Br. Motor Dr.
Crescent 36" Ball Br. Vee Motor Dr.
Crescent 36" Ball Br. D.M.D.
Fay & Egan No. 345 36"
Fay & Egan 48" Belt or Motor Dr.
BORING MACHINES: Fay & Egan No. 190 Sgl. Spl. Vert.
Root Sgl. Spl. Motor on Spl.
Andrews Multiple Vert. 42" 5 spl.
Dennis Sgl. Vert. Universal
Greenlee Post Borer
BOX MAKERS MACHINERY: Mereen Johnson No. 460 Box Maker Rip
Beach Box Maker Carriage Cut Off
Hall & Brown Box Board Matcher
Luther Box Board Matcher
Nailing Machines (several)
CLAMP CARRIER: Handy 12 ft. 6 wheel 18 leaves 6—31" clamps each 95% New
CLAMPING MACHINERY: American fig. 8853 8 ft. x 4½ ft. Door Clamp
American Comb. Sash & Door Clamp
Rowley & Hermance Door Clamp 3½ x 8 ft.
Lancaster Pneumatic Chair Clamp
Handy No. 100 Bed Clamp
Black Bros. Chain Clamps
American Q. A. Sash Clamp
3000 Spring Clamps No. 2 and No. 3
DADO SAWS: Fay & Egan No. 5 C.O. and Dado Saw
American No. 1 Dado Saw Auto.
Hall & Brown No. 134 Comb. C. O. & Dado Saw, Power Feed
CUT OFF SAWS: Oliver No. 94-D St. Line C.O. Saw with Roller Tables 95% New
Holmes No. 102 Lightning C.O. Saw
Greenlee No. 453 Auto. Railway C.O. 7" cap.
Greenlee No. 456 Auto. Railway C.O. 12" cap.
Beach Carriage C.O. Saw
Swing Cut Off Saws (several)
Fay & Egan Table C. O. Saw
DOWEL MACHINES: Hawker No. 2 Ball Br. ¼"-2" cap. M.D.
American No. 1 cap. ¼"-1½". 10 sizes cutters
Fay & Egan No. 406 Rod Machine
Bench Type Hand Feed Dowel Mch.
JIG SAWS: Oliver No. 173-B Ball Br. Self Contained Motor built in. New at Bargain Price
Beach No. 1 Tilting Table Scroll Saw
JOINTERS: Crescent 8" Hvy. Duty B.B. M.D.
Cordesman 9" Rd. Hd. Jointer
12" 4 knife Rd. Hd. Jointer
16" Fay & Egan No. 316 B.B. M.D.
Smith 16" 4 knife Jointer
Fay & Egan 20" rd. hd. Jointer
Oliver No. 12 24" Rd. Hd. Jointer
Fay & Egan 24" No. 115 Belt or Motor Dr.
LATHE: Oliver 12"x5 ft. Sgl. Ph. Motor Headstock 24" swing 7 ft. Iron Bed Pattern Lathe with Hand Feed Carriage, M.D.
Wood Lathe Sets 12" to 24" swing
MORTISERS:
New Britain No. 4 Chain with H. C. Attach.
New Britain No. 7 Chain, Compound Table M.D.
Wysong & Miles No. 134 H. C. Auto. Feed
Colladay Vert. H. C. Motor on spdl. B.B.
Beach Mfg. Co's H. C. Comp. Table M D
American H C. Horizontal Auto. Feed
MOULDERS:
4" 4 side Ball Br. Electric (New)
Colladay 5" 4 side
American No. 3 Heavy 6" 4 side
Fay & Egan No. 207 7" 4 side
American 8" 4 side
Hermance No. 50 8" 4 side Bab.
Hermance 10" 4 side
American No. 505 10" 4 side
Fay & Egan No. 184 12" 4 side
NAILING MACHINES:
Grammes 4 track Cigar Box Nailer
Doig 2 track Cigar Box Nailer
Doig 3 track Close Back Nailer
Doig 6 track Close Back Nailer
Doig 10 track Close Back Nailer M.D.
Doig 9 track O.B. Cleater
Doig 14 track O.B. Nailer
Doig 14 track O.B. Nailer w. Side Arm
Doig 18 track O.B. Nailer w. Side Arm
PLANERS—DOUBLE:
Berlin No. 177 30"x12" $750.00
American 26"x8" Double
Whitney P-6 30"x7" Double Rd. Hd. Sect. R. & C. B.
PLANERS & MATCHERS:
Turner 18"x8" 4 side
Fay & Egan 24"x6" 4 side
PLANERS—SINGLE:
Yates Amer. No. B-44 24"x8" B. B. 3 knife sect. Roll & C. B. 7½ hp. motor on head
Crescent 26"x8" Var. Feed D. M. D.
Crescent No. 224 24"x6" Var. Feed M. D.
Oliver No. 99 24"x6" single
Fay & Egan No. 2 24"x6"
American No. 1 20"x6"
Parks 12"x4" B. B. Floor Type
Parks 12"x4" B . B. Bench Type
New 16"x6" B. B. 3 knife rd. Hd. $524.00
RADIAL SAWS:
DeWalt type G. E. 5 hp., 3 ph.
Walker Turner 2 hp., single ph.
Monarch Uni-Point 5 hp., 3 ph.
NEW MULTIPLEX RADIAL SAWS IN STOCK:
No. 20-A ½ hp. single ph.
No. 30-A ¾ hp. single ph.
No. 40-A 1½ hp. single ph.
No. 50-A 5 hp., 3 ph.
RIP SAWS:
Mattison No. 205 St. Line Motor Dr.
Falls No. 103 St. Line B. B. 15 hp. motor
Falls No. 103 St. Line B. B. Belt Dr.
Greenlee No. 427 Self Feed
Greenlee No. 429 Self Feed 12" cap.
Yates American No. 0 Self Feed B. B. 15 hp. built in on arbor.
Bel-Saw Gang Self Feed
ROUTERS:
Kelley Elect. Stair Router 3 ph.
Cincinnati Elect. Stair Router
Hunter Elect. Stair Router $100.00
Duro Elect. Floor Type
Portable 1 hp. and 2 hp. New
SASH COPERS:
American Foot Power Sash Coper
Electric Bench Type Sash Coper
SAW FILING MACHINERY:
Foley Band Saw Filer
Wardwell Band Saw Filer
Covel Resaw 4" Tension Rolls
Power Band Saw Setter
SANDERS:
Smith No. 401-D 3 dr. Endless Bed M D.
Yates Berlin 48" 3 dr. roll feed
American No. 15 24" single dr. Hand Feed
American No. 15 30" single dr. Hand Feed
Mattison No. 115 Variety Belt Sander
Wysong & Miles No. 171 Belt Sander
Yates Amer. Comb. 15" disc & Belt M.D.
Yates Amer. Comb. 15" disc & Drum M.D.
BOICE CRANE OSCL. SPINDLE SANDER SPECIAL
New Wysong & Miles No. 303 Combination

ERVIN MACHINERY CO., INC.
124-26-28 Boulevard of Allies Pittsburgh, Pennsylvania

Rebuilding

AT ITS BEST!



At Left, a partial view of our warehouse looking toward the rear, showing only about one-third of our stock.

Owing to our very large stock changing almost daily, we are omitting our stock list. We have about 350 new and used machines. Tell us exactly what you want, and advise phase, cycle and voltage of your current.

Here at Osborne & Sexton, you will find an

anteed and must be satisfactory, as our users

what you want, and advise phase, cycle and voltage of your current.

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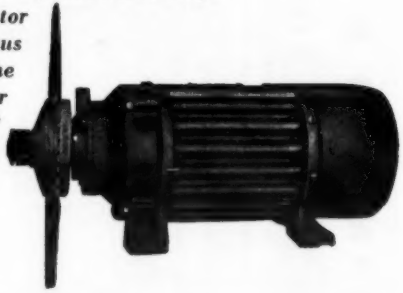

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Herzog 24" feeder, mtr. dr., b.b.; power hoist; 3-knife rd. hd. jointer, direct coupled drive
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American 16", Ball Bearing V belt drive
LATHES: Mattison No. 57-D Auto. Turn., M.D.
PLANERS: American 24", No. 5, Sgle., plain bearing, motorized
American 26" Sgle., Cabinet, Ball Bearing, coupled drive
Whitney 30" Cabinet, plain bear., V belt, M.D.
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Ecco No. 111 Edge Belt, B.B., direct mtr. dr.
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American Dble. Cut-off Saw, 5' cap., chain feed, D.M.D.
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Oliver No. 270-D Tilting Arbor, direct mtr. dr.
Porter C-43 Cut-off direct motor driven
Wallace Radial Arm Saw, direct motor driven
Hermance No. 36 Straight Line Rip Saw, direct coupled drive, belted feed
American No. 1 Gang Rip Saw, motorized
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Band Saw, New Northfield 20" ball bearing
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Boring Machine, Newton 2 spindle horizontal
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Chucking Machine, Smith, 3 HP motor
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Knife Grinder, auto Rogers style F-32"
Lathe, Auto. Berlin with heads, B.D.
Lathe, Propeller Fahlin 10' motor drive with wood patterns and jigs
Lathe, Waymouth, Automatic
Mortiser, Crescent Hollow Chisel, New
Moulder 9"—4 side Fay & Egan with motor
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Planer, single 16x6" Powermatic, New
Planer, single 24x6 Northfield No. 5, New
Planer, single Crescent No. P-24—24 x 8 ball bearing, direct motor drive.
Planer, 12x4" Boice Crane No. 1002, New
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Rip Saw, Chain Feed Mattison No. 205 M.D.
Router, Onsrud No. W-240D—5 HP late type
Router & Borer, Radial Arm, Onsrud No. A1
Router, Yates-American No. U-90
Router, Duro floor model, M.D.
Router, Radial arm No. A1-R with freq. changer
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Sander, Belt, Auto., Curtis 6'
Sander, Nash auto. belt for Bowling Pins
Sander, Belt 8' Schimmel Reid Semi Auto.
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Saw, 12" tilt arbor, Dara-James New
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Saw Table, Crescent No. 3, double arbor
Saw, Swing, H. & A. No. 5—10", New
Saw, Swing, H. & A. No. 25—14", New
Saw, Swing, H. & A. No. 55—16", New
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Saw, Variety Sidney tilt table
Shaper, American No. 20 with 2—5 HP motors
Tenoner, Hall & Brown No. 51 with copes
Tenoner, Yerkes & Finan Copes and Cut-off
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Dodds 12 Spindle Dovetailer
Diehl No. 60 Glue Jointer, ballbearing, motor drive
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Vonnegut 6 in. Electric Moulder, hopper feed
Yates-American C-88 - 8 in. Electric Moulder
Vonnegut 12 in. Electric Moulder
Woods No. 76-M - 30 in. Heavy Duty Single Planer, 30 H.P. direct motor drive
American No. 666 - 36 in. Double Cabinet Planer, d.m.d.
Buss No. 4 - 30 in. Double Cabinet Planer, d.m.d.
Jones-Superior No. 46 Self Contained Jig Saw, 2 H.P.
Tannewitz Tilting Arbor Saw, 5 H.P.
Mattison No. 207 Chain Feed Ripsaw, 10 H.P. V drive
Yates-American G-77 Chain Feed Ripsaw, motor driven
Diehl No. 75 Chain Feed Ripsaw, motor driven
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Jenkins No. 96 Ball Bearing Belt Drive Double End Tenoner
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Greenlee No. 110, 36" Single Planer
Fischer 40" Vertical Band Resaw
Mattison No. 207 Feed BB DMD Rip Saws
No. 36 BB MD Chain Feed Rip Saw
Yates G-2 MD Rip Saw
American BB DMD Tilting Tab'e Saw
Yates S-7 6 ft. Hand Lever Stroke Sander
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36" Yates American DMD BB V36
Northfield BB & DMD, 20" to 36"

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Horizontal—2 Spindles—Various makes

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American 16" Wedge Bed, BB
Smith DMD 24" BB with Smith Finger Feed & Motor

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Wysong & Miles 5 Sp. Horizontal, B.D.
New Britain No. 3
New Britain No. 7

MOULDERS

Woods No. 701 12" x 4 BB all electric
Mattison No. 229 DMD 8" w/hopper

PLANERS

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24" BB DMD No. 44 Single American
Whitney No. 32 40" DMD Double
Fay & Egan 30" dbl. No. 140 4-knife Rd. hd.

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G-77 Yates BB DMD, Motor Feed

SANDERS

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10" Porter Cable B 3 MD
Peerless Horizontal 14" - 20" - 26"
43" 2-Drum Endless bed BB MD No. 399 Fay & Egan
W & M Underbelt DMD
Wysong-Miles Hand Block Belt, DMD
Yates American Underbelt DMD
Porter Cable 15" disc DMD
Porter Cable Wet BG 8 MD
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DeWalt radial saw 3 and 5 HP
Fay & Egan BB Tilt Top
Tidey Saw Tbl. VBD with Rolling Carriage
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Union Single Spindle, BB, MMBD
Defiance Double Spindle, DMD with tilting & Sliding heads
Whitney, No. 102 Automatic Shaper, m.d.
Yates N1 DMD, w/Freq.

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Morgan Box Board matcher
DeWalt Timber Cutter, 10 H.P.
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Palmer 16-section clamp carrier, 6-ft.
Greenlee No. 493 Motor Driven Tilting Ar- bor Variety Saw, 5 hp on arbor
Greenlee No. 212M Motor Driven 4-Spindle Horizontal Hollow Chisel Mortiser
American B-36—36" MD BB Band Saws
Tannewitz Type G3 and GH Direct Mtr. Dr. B B Band Saws
Onsrud W-123 DMD Automatic Shaper with frequency changer
Whitney & Yates Mtr. Dr. BB Double Spindle Shapers
Whitney No. 91 Mtr. Dr. BB High Speed Double Spindle Shapers
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Whitney BB 30" Double Planer.
* Whitney No. 24—40" Double Planer.
* Whitney No. 33—40" Heavy Duty Dbl. Planer.
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Onsrud W-265 Electric Router.
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* Oliver 15" Single Disc Sander.
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Onsrud W-200 Single Spindle Shaper, BMD.
Porter No. 103 Single Spindle Shaper, BMD.
Porter No. 201 Double Spindle Shaper, BMD.
* Whitney No. 250 Double Spindle Shaper.
* Whitney No. 134 Double Spindle Shaper.
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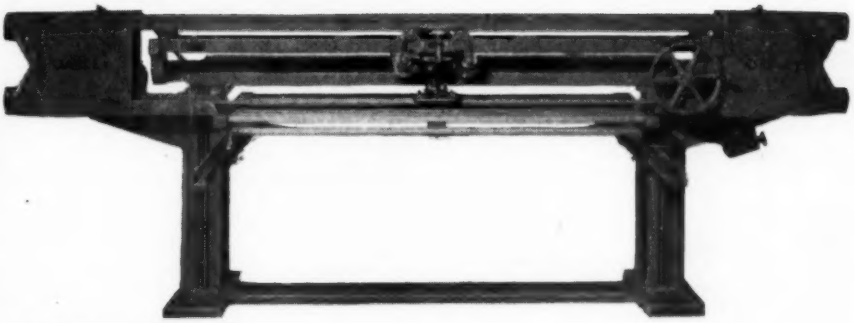

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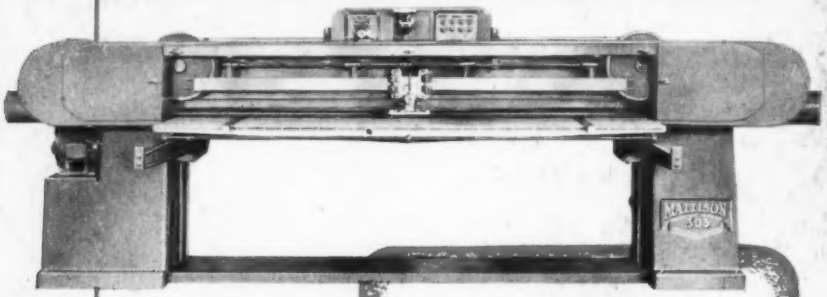
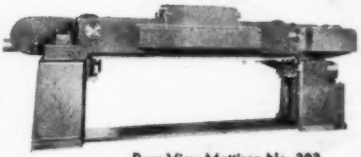


Front View Mattison No. 303
Automatic Stroke Sander — Single Belt

Mattison No. 303
Automatic Stroke Sander — Double Belt



Rear View Mattison No. 303
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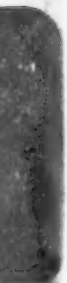
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